1970

Environmental Assessment Inventory and Quality Rating: Summary Report

Utah Division of Water Resources

Environmental Assessment

Inventory and Quality Rating

Summary Report

Bear River Basin

Environmental Assessment

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Summary Report

INVENTORY

AND

ASSESSMENT

OF THE

BEAR RIVER BASIN

PREPARED FOR THE

U. S. SOIL CONSERVATION SERVICE

BY

UTAH DIVISION OF WATER RESOURCES

BEAR RIVER BASIN
ENVIRONMENTAL ASSESSMENT
Present Conditions
1970

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BEAR RIVER BASIN

ENVIRONMENTAL ASSESSMENT

Working Statement

This statement describes the objectives, concepts, procedures, and criteria utilized in accomplishing an assessment of the environmental resources of the Bear River Basin.

The study plan for this task specifies that (1) a physical inventory of significant environmental features of the Basin be carried out and (2) that discernable trends reflecting changes in the quantities or qualities of the various components of the environment be determined and projected to the years 1985 and 2020.

1. The performance of this study requires a determination of relationships among the various components of the environment within the context of criteria describing selected environmental categories. These categories are groupings of areas, natural features, places or objects which are identified:
   1. For characteristics which contribute to esthetic quality.
   2. As a focus of human interest because of their scenic, historic, educational, scientific, or cultural significance.
   3. As important biotic resources, including:
      a. fauna
      b. flora
   4. For natural characteristics and ready accessibility to use and enjoyment by urban and rural residents as Open and Green Space.
   5. As contributing to land quality.
   6. As influencing air quality.

Environmental resources grouped in one or more of the foregoing categories will also be selectively evaluated and rated within criteria which further distinguish them:

1. For their uniqueness - rarity of occurrence.

OBJECTIVE - ENVIRONMENTAL ASSESSMENT

1. The essential purpose of the inventory and quality rating process of the environmental assessment is to identify significant environmental features, to assign environmental values to the feature identified, and to provide a basis and a method for evaluating the impacts of various action measures. Measurement of impacts resulting from implementation of alternate plans must begin with the identification of significant environmental features and conditions as they presently exist.

Steps toward this purpose include:

a. Identification, classification, and location of important environmental resources.

b. Inventory of significant environmental features identified in (a) above.

c. Quality rating of environmental features within the context of criteria for uniqueness, human influence, and dimensions of quality for the category under consideration.

d. Collation, organization, and summarization of environmental data.

A second step in the process is to assess recent historic trends in the quantities and the quality of the selected environmental resources and to make appropriate projections of those trends. The future profile of expected environmental conditions provides the baseline from which changes in the quantity and quality of environmental resources produced by alternate resource plans can be evaluated.

In the planning process, the accomplishment of the above listed tasks will contribute to:

1. Use of the data as one determinant of the impacts of alternate action or non-action plans.
2. Providing a base for assessing tradeoffs between environmental, economic or social effects.
3. Placing beneficial or adverse changes in environmental components in a perspective to the total environment.
4. Defining the plan which will maximize economic and social benefits at the least, or no-cost in environmental values.
5. Public participation in the decision-making process.

THE CATEGORIES

Major categories selected as encompassing physical components which make up the most comprehensive image of the environment of the Basin include:

I Aesthetics

II Human Interest

III Biotic Resources

IV Open and Green Space

V Land Quality

In keeping with the broad range of inquiry described in the Plan of Work for the Type IV River Basin Study of the Bear River Basin, the selected categories are broad in scope and cover a wide range of environmental features. Under the criteria developed for quality rating in the several categories, the entire surface area of the Basin is rated, with some areas being rated in two or three categories. These multiple ratings are usually an indication of high environmental value or represent areas where changes in land use are taking place.

A first step toward initiating the evaluation process is a description of that which is to be evaluated. Environmental categories must be more than abstract ideas. They must be made of "real" objects or features with structure, form, and dimension. A first step toward inventory, therefore, calls for a listing of the physical characteristics which contribute toward the make-up of a category.

I. Esthetics

Evaluation of selected components of the environment in respect to their contribution to the over-all esthetic quality of the environment of the Bear River Basin is one of the tasks undertaken in the assessment.

The word "esthetic," in its broadest sense pertains to "beauty" or to "a sense of the beautiful." "Esthetics," involves visual perception experiences and the awareness of things sensed through smell, hearing and touch. Of these, the visual perception experience is usually the most dominant and the model for evaluation of esthetics is structured around those components of the environment which are generally the focus of visual observation and evaluation by individuals.

However, a complicating factor in the esthetic evaluation is the wide diversity in "esthetic sensitivity" among individuals. Each person assigns a weight to each component of a scene and integrates it into a whole in a manner unique to himself. "Beauty lies in the eyes of the beholder."

Another aspect of esthetic awareness must be considered. This is the varying dimensions of beauty upon which our attention is focused. Beauty comes in small and large packages. An experience may occur as the sight of a single flower reflected in the placid surface of a small pool, or as a panorama of forest, lake, and mountain from a high viewpoint. Regardless of

scale, however, there is a widely varying and interacting complex of physical elements in each esthetic scene. Such complexities, in combination with individual sensitivities make it difficult, if not impossible, to formulate a simple but comprehensive system of esthetic quality rating.

We are constrained, therefore, to the qualitative evaluation of major physical units, which in general concensus, go toward making up the esthetic components of an area. In so doing, it is recognized that the quality rating of the various esthetic features are not additive; that is, their sum is less than the whole.

The major features inventoried and assessed for esthetic quality include:

Lakes and Reservoirs

Streams

Scenic Areas

Other Land Areas

The geographic scope of the inventory ranges from an assessment of stream segments (Canyon Reaches and Valley Reaches) to the appraisal of some rather extensive land areas included in the Scenic and Other Land Areas classifications. All data was summarized to the Watershed, County, Sub-basin and State level. Quality ratings for each inventoried component of the esthetic category in each watershed were expressed separately and no attempt was made to combine components into a composite esthetic rating for watershed or sub-basin.

II. Human Interest

The human interest category includes areas, objects or places which are recognized as having important educational, scientific, scenic, historical, cultural, or other interest-stimulating aspects and which are valued for these reasons. Examples of elements encompassed in this category include:

Historic--Bear River Battleground, Oregon Trail, Mormon Trail.

Scientific--Educational--Jardine Juniper, Limber Pine at Logan Summit, Bear River and Dingle Bird Refuges.

Other--Caves, springs, water bodies, viewpoints, etc.

Where any items have been given formal importance classification, such as inclusion on the Register of Historic Places, this classification will be so indicated.

III. Biotic Resources

The meaning of this category is generally understood since it involves a display of wildlife species and their habitats. Identification of these resources is on a widespread basis because of the diffused and transient nature of wildlife populations and because of the shared habitat with domestic animals and other uses. The inventory is generally descriptive of species, threatened or otherwise, their general distribution, etc. Where identification and delineation is possible, critical habitat areas are located and their environmental condition or importance given a rating.

1. Biota Category

Rare and Endangered Species

Sport and Recreation Fauna

Fish species

Big Game

Small game-furbearers

Upland game birds

Water fowl

Predators

Non-game Wildlife

General and specific game habitats

Flora and Eco-systems

Unique or significant flora

Dominant plant types are identified through an ERTS imagery map and are further delineated in Range Site and Condition Classes. Other plant associations or conditions are described where such a separation will contribute to a more comprehensive image of the basin environment.

IV. Open and Green Space

The pattern of land use and development presents a mosaic of land capabilities and conditions which can be segregated into land use and use-intensity classes. The set of criteria describing the various classes apply to land and water areas and reflect impacts of land use, quality of the plant cover in relation to the pristine vegetation and the spatial character of each class. Basic data used in these determinations is derived primarily from vegetative maps and Range Site and Condition delineations and other land use patterns. The makeup of the classes are set forth below:

1. Wild and roadless areas. Lands in native vegetation ranging from marshland to alpine areas that are essentially undisturbed.
2. Commercial forest and areas dominated by tree cover.
3. Non-woodland range areas in excellent and good condition.
4. Irrigated land.
5. Non-woodland range areas in fair and poor condition.
6. Built up areas - high density - well planned urban.

7. Built up areas - low density - poorly planned and maintained.
8. Water areas (varying qualities).
9. Dry cropland areas.
10. Industrial areas.

The segregation of land areas listed in the classes above reflects degrees of spatial and green qualities which are essential dimensions of the Open and Green Space Category.

V. Land Quality Category

Another facet of the over-all quality of the environment is the capability of land to provide man's essential needs under various uses. In this context, "essential needs" are construed to include satisfaction and development of man's rapport with nature as well as to fulfill his requirements for the more conventional products of the land.

A measure of environmental health of the land is its ability to produce under any specified use on a sustained basis without degradation. This capability is measured through the use of Land Capability and treatment groups for cropland, through Range Site and Condition classes on range lands, and woodland production classes in forested areas. Detail comprehended in this category is shown on the inventory tables in Appendix V.

VI. Uniqueness

This is a quality characteristic which further distinguishes some environmental resources already identified and rated in other specified categories. It would describe features which are of special significance because they are rare, unusual, or extraordinary in the nation or the region. It is probable, for example, that Bear Lake will receive major consideration

under this element of evaluation. The uniqueness of a resource will be evaluated in relation to its frequency of occurrence in the nation or region.

Evaluation Units

The components of the broad categories inventoried and quality rated vary widely in nature and areal scope. Because of this diversity, it is not possible to convert the several evaluated elements in each category to a common denominator for purposes of summation.

The Standards and Procedures for the study call for summarization of the data by counties, states, and sub-basins. For the environmental assessment, it was thought that the data would be more meaningful if the unit of evaluation was the designated Conservation Needs Inventory (CNI Watersheds) watershed. This posed problems of balancing acreages of land use and ownership but the data in the Appendices are presented in units of watersheds. However, summaries in this main working paper are presented in accordance with criteria set forth in the Standards and Procedures.

Assessment Design

The design of this assessment is directed toward the measurement of extensive changes in major environmental components. This is in keeping with the level and scope of inquiry for the Cooperative River Basin (Type IV) Study as described in the study Work Plan.

Basically, the assessment is meant to provide a baseline condition for the measurement of the environmental consequences of applying a number of presently unspecified alternative land and water measures at various locations throughout the Basin. The measurement of these impacts will be in terms of changes in numerical quality ratings. The differences between the baseline

ratings and the rating which reflects the impact of the proposed action will identify the magnitude of impact. Comparison of the quality impacts of several alternatives will permit the development of an impact array which will identify the relative environmental costs (or benefits) of the several alternatives.

This approach is in contrast to the conventional problem-oriented type of assessment whereby specific environmental problems are linked to a proposed action and the baseline condition encompasses only that area or those environmental resources directly affected by the proposed action.

In measuring impacts of various proposed actions in terms of changes in quality ratings of specific environmental components, the quality values shown in the appendices should be used, rather than the composite ratings shown for watersheds or counties. Thus, the esthetic impact on a specific lake may be measured by applying the rating criteria to the lake with the proposed action in place.

In some categories, such as land quality or Green and Open Space, the nature and magnitude of the action may be such that no significant change in the rating number may result from the action. In all cases, however, an action should be evaluated at the watershed or individual component level, rather than at the composite county or state level. Although the projections of land use are summarized on a county and state basis, the quality ratings in the various categories are restricted to a watershed level.

HISTORY OF THE BEAR RIVER BASIN

EARLY EXPLORATION - THE FUR TRAPPERS

The event which initiated the exploration and the rising tide of settlement in the Far West was the successful completion of the Lewis and Clark expedition of 1805-06. The knowledge of the regional resources gained by this expedition fired the imagination of hundreds of ambitious enterpreneurs and restless young adventurers in the East. Among those stirred to action by visions of wealth in the fur trade was one John Jacob Astor. He, along with a number of others, organized the Pacific Fur Company and dispatched parties of trappers and traders by land and by sea in 1811 to establish a headquarters post at the mouth of the Columbia River in what was later Astoria, Oregon. In one of the many ill-advised actions which characterized the conduct of the land party journey, several trappers were detached from the party at abandoned Fort Henry on the upper Snake. That autumn, this small group journied some 200 miles to the south where they successfully trapped on a river which they reported "discharged into the Pacific Ocean." From this account, later substantiated by other evidences, it would seem likely that this party trapped on the lower Bear River. On August 20, 1812, Robert Stuart, a partner in the enterprise came upon this starving and emaciated group somewhere in the general vicinity of Twin Falls, Idaho. Being enroute to New York, with dispatches to Mr. Astor, he prevailed on Miller, one of the group, to guide him. Miller took them up the Portneuf and over into the Bear, which Stuart called Miller's River. To evade troublesome Indians, they crossed over into Salt River. While in the Bear, the party followed the approximate route of the later-to-be-established Oregon Trail.

After the withdrawal of the Americans from the Oregon Country, the headwaters of the Columbia and the Snake were extensively explored and trapped by representatives of the British Northwest Company. Although there is little direct reference to Bear River in company records, Ross of the Northwest Company quotes Donald McKenzie in a letter from "Black Bears Lake" in 1819. This is the name originally given to present Bear Lake.

Widespread exploration of the Green River and Great Basin areas began with Ashley's penetration into the region in 1824. One of the Ashley trappers, Jim Bridger, is credited with floating down the Bear from Cache Valley in late

1824 and with being the first white man to see Great Salt Lake. From that time on parties of trappers fanned out through the headwaters of the Bear and adjacent river basins. A trapper's rendevous was held in the vicinity of Hyrum in 1826 and near Lake Town in 1827.

One of the best documented explorations of the lower Bear River Basins was that of Fremont in 1843. In this, his second expedition to the West, he dropped into the Bear River drainage somewhere in the vicinity of Grace and followed it down to Great Salt Lake, making a trip to Fremont Island at that time. His return route took him up the Malad River Valley. In his description of Cache and Bear River valleys, he states: "nutritious bunch grass is abundant, service berries flourish, lumber and water is plentiful and the soil is well adapted to grain." Such favorable reports were bound to influence the tide of settlement which began with the entrance of the Mormons into Salt Lake Valley on July 24, 1847.

Only fragmentary remnants of the original trapper and explorer routes can be identified today. In respect to their major alignment, most travel routes originated as game trails, the successively Indian, trapper, explorer and settler routes. Today, most of the major trails are occupied by the concrete and asphalt of our transcontinental highways. However, some remnants of the Oregon Trail can still be seen. One such section crosses the ridge to the north of the present highway between Border, Wyoming, and Montpelier, Idaho. The major part of the Sublette Cutoff in the Sublette Creek drainage (a tributary to the Bear) is still discernable. Parts of the Lander Cutoff Trail in upper Smith's Fork can be easily traced.

It is probable that many of the old trapper's trails later became wood roads. Even though not subject to precise identification, the approximate trapper route between Cache Valley and Bear Lake, through Blacksmith Fork, can be traced. Many other trapper routes with fragmentary traces of the old trail remaining could probably be found.

The Era of Settlement

Few, if any, of the early travelers through the Bear River Basin enroute to Oregon became permanent Basin dwellers. Probably the first was Pegleg Smith who established a trading post on the Bear River in 1848 somewhere in the vicinity of Dingle, Bear Lake County. A wave of Mormon colonization began in Cache Valley in 1856 and spread throughout the Basin during the 1860's and '70's.

ENVIRONMENTAL CONDITIONS OF THE BEAR RIVER BASIN

The headwaters of the Bear River drain a unique and high quality environmental area of the north slope of the Uinta Mountains in Summit County, Utah. Flowing northward and fed by many small, clear mountain lakes, it falls steeply through deeply incised and wooded canyons. Near the Utah-Wyoming border, the stream gradient changes abruptly as it follows a 300 mile meandering course to the Great Salt Lake.

The course of the river and its tributaries through Wyoming, Idaho, and finally back into Utah, is marked by a changing mosaic of agricultural and urban development, extensive mountainous, lake, and reservoir areas. Essentially, the dominant over-all aspect of the Basin is rural or natural with "development" as typified by urban or industrial land use occupying relatively small and localized sections. Viewed as a whole, the Basin is environmentally stable with the present state of the major environmental components, air, land, and water, exhibiting no active trends toward further impairment beyond that reached as a result of historic use.

Historic land use in the Basin generally follows the traditional pattern of exploitation which characterized early settlement. During that period, pressure on natural resources was heavy. Much of the suitable timber was used to build the railroads, mines, and towns. Irrigation developments produced major streamflow alterations on the main stem and most of its tributaries. Early period grazing enterprises often exceeded the capacity of the range-lands and brought about deterioration over extensive range areas. At the baseline year, urban development has not been a problem of any magnitude.

Even though exploitation and over-use of some of the resources did occur during the early settlement period, many areas were only lightly touched,

if at all. Notable among such areas is the mountainous headwaters of the Bear River in the High Uintas and some sections of the Wyoming portion of the Basin. Over 75% of the Basin's rangeland falling in the Excellent and Good classes is located in the Wyoming counties of Lincoln and Uinta.

Over the past 30 years, programs of land use throughout the Basin have featured consolidation and conservation as opposed to the raw exploitation which characterized much of the early settlement period. Shifts in ownership and emphasis on soil and water conservation in the private sector have gone hand in hand with the extensive adjustments in use, particularly grazing which are being applied on federal lands.

As a result of these efforts, there is a slow but discernable trend toward over-all improvement. There remains, however, considerable opportunity for enhancement of the environment through restoration of large areas of native vegetation to their former level of productivity (and environmental quality), through improvement of water quality by control of point and non-point sources of pollution and through planned and controlled urban and industrial growth. There are probably some enhancement potentials in a continuation of the on-going shift of dry cropland to irrigated land.

The following summary displays of the quantities and qualities of major environmental features substantially represents conditions of land use and environmental quality as they existed in 1970. As would be expected, many changes have occurred over the five-year period, 1970-1975, and persons engaged in the Type IV Study experience some difficulty in isolating such recent changes from the baseline data of 1970.

LAND USE AND VEGETATIVE TYPE DISTRIBUTION

It is not possible to fully display all dimensions of land use and vegetative patterns in a statistical table. However, a tabulation of the areas occupied by various land uses and vegetative types within a specified geographic delineation contributes to a concept of land surface conditions in a watershed and gives a perspective of broad environmental conditions.

The following tabulations show the distribution of areas of water, land uses and vegetative types by watersheds and sub-basins. The county and state distribution is also shown. The total acreage assigned to native vegetation is somewhat greater than that shown in other working papers. This is accounted for by the numerous small bodies of native vegetation interspersed throughout the "developed" areas. These "inclusions" were too small to delineate on the standard scale maps used in the study. Other sources of information gave a fairly precise measurement of water areas and the various land uses in the so-called "developed" areas. The sum of these, subtracted from the total area in each watershed gave the gross area of native vegetation. That acreage representing the "inclusions" was distributed through the vegetative types of meadow-marsh, greasewood, sagebrush, barren and mountain brush in accordance with conditions of topography, climate, soils, and other factors known to exist in each watershed.

In the tabulations set forth in following sections of this report, data is tabulated by Conservation Needs Inventory Watersheds. These are geographic areas identified and delineated by the Soil Conservation Service. The Location Map which follows the Table of Contents will enable identification of the location, extent, and configuration of these watersheds.

Bear River — Subregion I — Land-Water-Land Use & Vegetative Type Areas

Table 1. — Bear River Basin

CNI Watershed	Total Surface Area	Water Area	Land Area (Rounded)	Cropland Area (Rounded) Irrig.	Dry	Total	Total Non-Crop land Area	Urban Builtup Industry Area	Net Area - Native Vegetation - Barren Areas: Total Area (Rounded)	Meadow Marsh 1	Grease Wood 3	Sage Brush 4	Mtn. Brush 5	Conifer 6	Barren 8	Juniper 9	Aspen 10	Al
1a - 9	71,530	29,300	42,260	140	200	340	41,920	300	41,620	11,410					30,210			
1a - 23	213,612	700	212,910	15,000	63,400	78,400	134,510	1,400	133,110			53,910	60,320	9,875			9,005	
1a - 24	107,724	800	106,925	10,700	29,500	40,200	66,725	2,400	64,325			11,430	34,395	3,725		9,200	5,575	
1a - 29	66,618	40	66,580	6,900	14,500	21,400	45,180	850	44,330			21,945	22,385					
1a - 30	373,419	13,300	220,125	54,800	20,300	75,100	145,025	5,300	139,725	24,330	16,900	59,225	16,620		22,650			
1a - 31	162,270	13,400	149,500	27,760	10,000	37,760	112,740	4950	107,790	10,460		21,990	55,380		12,940		2,060	
Total	965,777	57,540	798,300	114,300	137,900	252,200	546,100	15,200	530,900	46,200	16,900	168,500	189,100	13,600	65,800	9,200	21,600	
Box Elder		56,040		88,600	45,000	133,600		11,400	333,500	46,200	16,900	103,200	94,400		65,800		7,600	
Utah		56,040		88,600	45,000	133,600		11,400	333,500	46,200	16,900	103,200	94,400		65,800		7,600	
Oneida		1,500		25,700	92,900	118,600		3,800	190,200			65,300	87,500	13,600		9,200	14,000	
Bannock									800				800					
Franklin									500				500					
Power									5,900				5,900					
Idaho		1,500		25,700	92,900	118,600		3,800	197,400			65,300	94,700	13,600		9,200	14,000	

Cache Subregion II — Land-Water-Land Use & Vegetative Type Areas

Table 1 (con't) — Bear River Basin

CNI Watersheds	Total Surface Area	Water Area	Land Area (Rounded)	Cropland Area			Total Non-Crop Land Area	Urban Builtup Industry Area	Net Area - Native Vegetation - Barren Areas								
				Irrig.	Dry	Total			Total Area	Meadow Marsh 1	Grease Wood 3	Sage Brush 4	Mtn. Brush 5	Conifer 6	Barren 8	Juniper 9	Aspen 10	Alpine
1a - 15	127,908	520	127,280	13,500	17,100	30,600	95,980	600	96,080			11,890	59,830	6,680			17,680	
1a - 16	95,994	240	95,755	19,700	13,800	33,500	61,435	1,200	59,355			5,185	23,820	14,610		800	14,940	
1a - 17	170,903	770	170,030	15,400	26,000	41,500	129,090	4,600	123,750	1,390		43,660	11,600	8,675			58,425	
1a - 18	139,565	1,420	138,150	17,680	36,000	53,680	86,270	160	84,410			30,675	47,430	3,575			2,730	
1a - 19	6,490	-	6,490	2,140	200	2,340	4,150	530	3,620			1,620	1,480	520			-	
1a - 20	65,796	150	65,645	7,220	12,900	20,620	45,025	410	44,615			15,520	29,095	-			-	
1a - 21	48,190	380	47,810	5,500	25,230	30,230	17,580	550	16,530			-	16,530	-			-	
1a - 22	135,560	150	135,410	-	-	-	135,410	-	135,410	3,615		12,400	4,740	20,020			94,635	
1a - 25	50,428	1,160	49,260	30,380	7,020	37,400	11,860	1,070	10,790			5,395	5,395	-			-	
1a - 26	122,672	1,200	121,470	32,730	9,920	42,650	78,820	6,200	72,620			18,970	15,535	3,205			34,910	

Table 1 (con't) Bear River Basin

CNI Watershed	Total Surface Area	Water Area	Land Area (Bounded)	Cropland Area Irrig.	Cropland Area Dry	Cropland Area Total	Total Non-Crop Land Area	Urban Builtup Industry Area	Net Area - Native Vegetation - Barren Areas Total Area	Meadow Marsh 1	Grease Wood 3	Sage Brush 4	Mtn. Brush 5	Conifer 6	Barren 8	Juniper 9	Aspen 10	Alpine 11
1a - 37	214,212	170	214,040	17,200	1,670	18,870	195,170	1,800	193,370	1,760		34,260	44,090	25,125			88,135	
1a - 38	202,013	1,040	205,060	18,210	26,250	44,460	160,600	3,650	156,950	210		41,210	49,615	6,690			58,725	
Totals	334,535	8,100	1,376,400	130650	178,000	358,600	1,017,800	21,270	996,500	6,975		221,285	309,160	89,100		800	369,200	
County and State Distribution																		
Cache	752,000	5,500		104,000	71,900	175,900		13,800	556,800	5600		69,200	166,900	52,100			265,000	
Utah	752,000	5,500		104,000	71,900	175,900		13,800	556,800	5600		69,200	166,900	52,100			265,000	
Bannock	65,400	200		1,100	12,300	13,400		200	48,600			13,300	20,100	4,000			11,200	
Caribou	125,500	300		24,000	14,600	38,600		1,100	85,500			46,000	24,200	6,900			7,400	
Franklin	426,000	2,000		51,500	79,200	130,700		6,200	287,100	1400		92,200	81,100	25,800			86,600	
Oneida	18,700	100							18,500			600	16,900	300		800		
Idaho	632,600	2,600		76,600	106,100	182,700		7,500	439,700	1400		152,100	142,300	37,000		800	105,200	

Table 1 (con't) Bear River Basin

CNI Watershed	Total Surface Area	Water Area	Land Area	Cropland Area			Total Non-Crop Land Area	Urban Builtup Industry Area	Net Area - Native Vegetation - Barren Areas									
				Irrig.	Dry	Total			(Rounded) Total Area	Meadow Marsh 1	Grease Wood 3	Sage Brush 4	Mtn. Brush 5	Conifer 6	Barren 8	Juniper 9	Aspen 10	Alp 12
1a1 - 1	178,625	34,400	144,226	8,600	2,800	11,400	132,826	700	132,125			96,770	4,495	6,650		4,495	19,715	
1a1 - 2	117,280	35,850	81,430	8,480	1,900	10,380	71,050	400	70,650	5,825		35,395	10	9,850			19,570	
1a1 - 3	168,380	1,500	166,880	11,100	13,100	24,200	144,190	1,470	141,220	9,605		44,235	9,665	34,395			43,320	
1a - 10	51,999	100	51,849	11,780	2,110	13,890	960	3,715	34,250			2,145	20,715	7,240			4,150	
1a - 11	27,757	140	27,617	4,400	8300	12,700	14,917	140	14,775			5190	1,575	5,340			2,670	
1a - 12	31,200	160	31,040	3,620	1,780	5,400	25,640	375	25,265			290	8,585	14,410			1,980	
1a - 13	89,595	850	88,795	2,500	13,700	16,200	72,595	100	72,495			1,325	26,080	12,415		670	32,055	
1a - 14	104,589	600	103,989	13,200	37,500	50,700	53,290	3,600	49,690			26,425	-	3,060		9,535	10,620	
Totals	769,435	73,600	695,836	63,700	81,100	144,870	551,773	10,500	540,465	15,430		211,775	72,125	93,370		14,695	134,080	
Rounded									540500	15,400		211,800	72,100	93,400		14,700	134,100	

Table 1 (con't)

Bear River Basin

CNI Watershed	Total Surface Area	Water Area	Land Area (Rounded)	Cropland Area			Total Non-Crop land Area	Urban Builtup Industry Area	Net Area - Native Vegetation - Barren Areas									
				Irrig.	Dry	Total			Total Area	Meadow Marsh 1	Grease Wood 3	Sage Brush 4	Mtn. Brush 5	Conifer 6	Barren 8	Juniper 9	Aspen 10	Alpine 12
Sub-Basin III																		
County and State Distribution																		
Bear Lake	497,000	37,900		41,400	40,800	82,200		7,300	369,600	12,600		116,500	62,100	81,600		2,700	94,100	
Caribou	102,800	1,300		13,700	37,500	51,200		2,500	47,800			23,900		2,600		8300	13,700	
Idaho	599,800	39,200		55,100	78,300	133,400		9,800	417,400	12,600		140,400		84,200		11,000	107,800	
Rich	169,700	34,200		8,600	2,800	11,400		700	123,400	2,800		71,400	10,000	9,200		3,700	26,300	
Utah	169,700	34,200		8,600	2,800	11,400		700	123,400	2,800		71,400	10,000	9,200		3,700	26,300	

Table 1 (con't) Bear River Basin

CNI Watershed	Total Surface Area	Water Area	Land Area	Cropland Area			Total Non-Crop Land Area	Urban Builtup Industry Area	Net Area	Native Vegetation - Barren Areas							
				Irrig.	Dry	Total			Total Area	Meadow Marsh 1	Grease Wood 3	Sage Brush 4	Mtn. Brush 5	Conifer 6	Barren 8	Juniper 9	Aspen 10
							(Rounded)										
Ia - 4	198,465	-	198,465	3,500	730	4,230	194,235	200	194,035	-10	2,135	56,850	64,740	-		64,700	5,610
Ia - 6	155,230	-	155,230	11,100	4,900	16,000	139,230	1,200	138,030		-	39,200	62,555	5,815			30,460
Ia - 7	248,881	400	248,481	16,500	4,000	20,500	227,980	1,500	226,480		-	85,385	63,770	29,595			47,730
Ia - 8	112,585	100	112,485	10,300	2,170	12,470	100,015	300	99,715		-	99,715	-	-			
Ia - 9	104,218	500	103,718	9,100	13,100	22,200	81,520	400	81,120		-	78,390	2,730	-			
Totals	819,379	1,000	818,379	50,500	24,900	75,400	742,980	3,600	739,380		2,135	359,540	193,795	35,410		64,700	83,800
Rounded									739,300		2,100	359,500	193,800	35,400		64,700	83,800
County and State Distribution																	
Rich	51,100	200		3,200	100	3,300			47,600		300	43,400	3,900				
Utah	51,100	200		3,200	100	3,300			47,600		300	43,400	3,900				
Bear Lake	171,200	100		19,900	16,800	36,700		1,600	132,800			92,300	27,000	4,000			9,500
Idaho	171,200	100		19,900	16,800	36,700		1,600	132,800			92,300	27,000	4,000			9,500
Lincoln	597,100	700		27,400	8,000	35,400		2,000	559,000		1,800	223,800	162,900	31,400		64,700	74,300
Wyoming	597,100	700		27,400	8,000	35,400		2,000	559,000		1,800	223,800	162,900	31,400		64,700	74,300

Table 1 (con't)

Bear River Basin

CNI Watershed	Total Surface Area	Water Area	Land Area	Cropland Area			Total Non-Crop Land Area	Urban Builtup Industry Area	Net Area - Native Vegetation - Barren Areas									
				Irrig.	Dry	Total			Total Area	Meadow Marsh 1	Grease Wood 3	Sage Brush 4	Mtn. Brush 5	Conifer 6	Barren 8	Juniper 9	Aspen 10	Alp
							(Rounded)											
Ia - 1	127,185	60	127,125	2,300	250	2,550	124,570	130	124,440	40,050		60,330	11,125	10,510			2,425	
Ia - 2	169,728	410	169,318	6,700	-	6,700	162,620	50	162,570	15,340		8,200	-	88,590			37,240	1
Ia - 3	234,984	1,490	233,494	22,300	750	23,050	210,445	2,800	207,645	1,300		158,200	31,420	2,195			14,530	
Ia - 4	239,248	750	238,498	18,600	1,700	20,300	218,195	450	217,745	40,410	3,300	125,905	24,290	-		16,365	7,475	
Ia - 5	89,975	90	89,885	6,500	500	7,000	82,885	200	82,685	-		23,155	22,580	5,315		5,135	26,500	
Ia - 6	162,794	300	162,494	23,700	300	24,000	138,795	570	138,225	-		108,310	485	8,890			20,540	
Total	1,023,910	3,100	1,020,810	80,100	3,500	83,600	935,810	4,200	933,300	97,100	3,300	484,100	89,900	115,500		21,500	106,710	1
County and State Distribution																		
Rich	469,100	1,100		48,800	2,500	51,300		1,100	415,600	78,300	1,300	213,400	41,400	14,500		19,100	47,600	
Summit	187,500	500						100	186,900	18,800		5,100		98,900	13,200		50,900	
Utah	656,600	1,600		48,800	2,500	51,300		1,200	602,500	97,100	1,300	218,500	41,400	103,400	13,200	19,100	98,500	
Uinta	301,000	1,300		31,300	1,000	32,300		2,800	264,600			234,700	15,200	2,100		2,400	10,200	
Lincoln	66,300							200	66,100		2,000	30,800	33,300					
Wyoming	367,300	1,300		31,300	1,000	32,300		3,000	330,700		2,000	265,500	48,500	2,100		2,400	10,200	

BEAR RIVER BASIN

TABLE 1a - SUMMARY

Table 1a

LAND - WATER - LAND USE AND VEGETATIVE TYPE AREAS

Geographic Area	Total Surface Area	Water Area	Land Area	Cultivated		Urban and Built-up Area	Natural Area - Native Vegetation - Barren Areas									
				Irrig.	Dry		Total Area Native Veg. (Rounded)	Meadow Marsh	Grease-wood	Sagebrush	Mtn. Brush	Conifer	Barren	Juniper	Aspen	Alpine
Idaho																
Oneida	332,843	1,600	331,243	25,700	92,900	3,800	208,800			65,900	104,400	13,900		10,000	14,000	
Franklin	426,518	2,000	424,518	51,500	79,200	6,200	287,600	1,400		92,200	81,100	25,800			86,600	
Caribou	228,282	1,600	226,682	37,700	52,100	3,600	133,300			69,900	24,200	9,500		8,300	21,100	
Bear Lake	668,160	38,000	630,160	61,300	57,600	8,900	502,400	12,600		208,800	89,100	85,600		2,700	103,600	
Bannock	63,162	200	62,962	1,100	12,300	200	49,400			13,300	20,900	4,000			11,200	
Power	5,850		5,850				5,900				5,900					
Total	1,724,815	43,400	1,681,415	177,300	294,100	22,700	1,187,300	14,000		450,100	325,800	138,800		21,000	236,500	
Wyoming																
Lincoln	663,360	700	662,660	27,400	8,000	2,200	625,100		3,800	254,600	196,200	31,400		64,700	74,300	
Uinta	301,030	1,300	299,730	31,300	1,000	2,800	264,600			234,700	15,200	2,100		2,400	10,200	
Total	964,390	2,000	962,390	58,700	9,000	5,000	889,700		3,800	489,300	211,400	33,500		67,100	85,000	
Utah																
Box Elder	534,441	56,040	478,401	88,600	45,000	11,400	333,400	46,200	16,900	103,200	94,400		65,800		7,600	
Cache	751,972	5,500	746,472	104,000	71,900	13,800	556,800	5,600		69,200	166,900	52,200			265,000	
Rich	689,920	35,600	654,320	60,600	5,400	1,800	586,500	81,100	1,600	328,200	55,300	23,700		22,800	73,900	
Summit	187,496	500	186,996			100	186,900	18,800		5,100		98,900			50,900	13,200
Total	2,163,829	97,600	2,066,189	253,200	122,500	27,100	1,661,400	151,700	18,500	505,700	316,600	174,800	65,800	22,800	397,400	
Sub-Basin I	854,937	57,500	797,437	114,300	137,900	15,200	530,000	46,200	16,900	168,500	189,100	13,600	65,800	9,200	21,600	
Sub-Basin II	1,384,536	8,100	1,376,436	180,600	178,000	21,300	996,500	7,000		221,285	309,200	89,100		800	370,200	
Sub-Basin III	769,436	73,600	695,836	63,700	81,100	10,500	540,500	15,400		211,800	72,100	93,400		14,700	134,100	
Sub-Basin IV	819,379	1,000	818,379	50,500	24,900	3,600	739,400		2,100	359,500	193,800	35,400		64,700	83,800	
Sub-Basin V	1,023,910	3,100	1,020,810	80,100	3,500	4,200	933,000	97,100	3,300	484,100	89,900	115,500		21,500	108,700	
BASIN TOTAL	4,852,198	143,300	4,708,898	489,200	425,400	54,800	3,739,500	165,700	22,300	1,445,100	853,900	347,000		110,900	718,400	13,200

E STHETICS

Lakes and Reservoirs

Among the watersheds, the Upper Bear (1a-2) is the most noteworthy in respect to the distribution of water bodies, with more than 385 small ponds and lakes ranging from one-tenth to one hundred twenty-five surface acres in size. Most of these do not support fish populations but their wide distribution throughout the watershed is a positive factor in the over-all esthetic quality of the area. Ratings for these lakes ranged from 7.0 to 9.6. Bear Lake is the largest body of water assigned a high rating. The rating of 9.0 was an adjusted value (from a criteria derived rating of 5.8) to reflect the character of color and the dominance of the lake surface in the scene from the Overlook.

The Bear River Bay watershed is distinguished for the largest ratio of water to land (0.69) and for one of the lowest esthetic ratings. The Fish Haven-St. Charles watershed is in second place with a water-land ratio of 0.44 but with a quality rating of 8.8 for water. South Bear Lake follows with a ratio of 0.24 and a water quality rating of 8.5.

ESTHETIC RATING FACTORS - LAKES AND RESERVOIRS

Numerical systems for rating the topographic and physiographic features contiguous to lakes and reservoirs reflect the concept that mountainous settings are more attractive than flatlands and that a diverse pattern of land forms add to the beauty of a shoreline. The area of evaluation for these two factors is generally restricted to a one-half mile perimeter from the lake's center.

TOPOGRAPHY

Classes	Slope - %	Distribution Groups %				
		0-20	21-40	41-60	61-80	81-100
		Diversity Index Values				
1	0-10	4	3	3	2	1
2	10-20	3	3	4	5	6
3	20-40	4	4	5	6	7
4	40-75	5	5	6	7	8
5	+75	6	7	8	9	10

Maximum diversity value points 29

PHYSIOGRAPHY

Classes	Surface form or configuration	% of evaluation unit 0-33	34-66	67-100	Max. Possible
		Diversity Index			
1	Flat	3	2	1	
2	Undulating	2	3	4	
3	Hilly	3	4	5	
4	Mountain-low	5	6	7	
5	Mountain-high	8	9	10	19

AESTHETIC QUALITY RATING OF VEGETATION

Aesthetic quality rating of six plant groups will be within a range of values from 1 to 10. The following numerical values are assigned to the six groups:

Plant Group	Numerical Value
Conifer-Aspen	10
Mountain Brush-Juniper	7
Marsh-Wet Meadows	5
Sagebrush-Grass	3
Cropland	2
Pickleweed-Salt Flats	1

Variety is recognized as enhancing aesthetic quality in a plantscape. A mosaic of intermingled plant groups gives a pleasing pattern of variety and form to the scene. Where such variety definitely contributes to the plant component of an area add the following enhancement points to the basic numerical values shown above.

Plant Group	Diversity Class	Added Numerical Value
Conifer-Aspen	1	2.0
Mountain Brush-Juniper	2	1.5
Marsh-Wet Meadow	3	1.0
Sagebrush-Grass	4	0.5
Cropland	5	0.3
Pickleweed-Salt Flats	6	0.1

CLARITY

Initially it was thought that two degrees of opacity could be determined. Subsequent observation showed that this was not practical. Consequently, those lakes or reservoirs where such distinction were initially made were combined into a class 3 opacity class.

Flat Water
(Lakes and Reservoirs)

Clarity

	Classes			
	5	3	2	1
	Clear	Opaque	Turbid	Muddy
Rating	10	7	4	2

Size Classes

	Class 1	2	3	4	5	6	7
Acres	1-3	3-10	10-50	50-100	100-500	500-1000	+1000
Stable Ratings	1	2	4	5	6	7	8
Drawdown <50%	--	--	1	2	3	4	5
Drawdown >50%	--	--	--	--	1	2	3

Maximum Points 8

Density

Land Acres Per Acres of Lake

	3000+	2000-3000	1500-2000	1000-1500	500-1000
Stable Ratings	1	2	3	4	5
Drawdown	-	-	1	2	3

Class

Fish Habitat Quality	I	II	III	IV	V
Ratings	5	4	3	2	1

Shoreline Characteristics - Scenic Setting

Class

	1	2	3	4
	Agricultural - Flat to undulating	undulating-Hilly	Canyon Site Mountainous-Wooded	Cliffs-Cirques Gorge-Wooded
Ratings	1	4	7	10

STABILITY AND DRAWDOWN

The rating system designed for water impoundments drawn down seasonally is based on the concept that the degree of adverse impact is inversely correlated with the size of the water surface remaining at the end of the drawdown period. Thus the drawdown surface in a large impoundment would be big enough to effect more esthetic dominance over the "mudflat" fringe than would be the case in a smaller body of water.

Size Classes

Lakes and Reservoirs

	Class						
	1	2	3	4	5	6	7
Acres	1-3	3-10	10-50	50-100	100-500	500-1000	+1000
Stable Ratings	6	7	8	9	10	10	10
Drawdown 50%	-	1	2	3	4	5	6
Drawdown 50%	-	-	-	1	2	3	4

Table 2. LAKES AND RESERVOIRS

SUMMARY - WEIGHTED ESTHETIC RATINGS

Watershed-County-State	No.	Surface Acres	Weighted Esthetic Quality Rating
Bear River - Malad	I		
Little Malad	1a-23	740	3.9
Deep Creek	1a-24	275	4.5
Brigham	1a-31	988	4.7
Bear River Bay	1-9a	9,700	3.2
Total - Sub-Basin	I	11,703	3.4
Idaho			
Oneida		1,015	4.0
Utah			
Box Elder		10,688	3.3
Cache Valley	II		
Cottonwood Creek	1a-15	50	5.6
Grace-Thatcher	1a-16	80	4.3
Guis River	1a-17	930	5.1
Battle Creek--Deep Creek	1a-18	650	4.2
Weston Creek	1a-20	90	5.0
Clarkston	1a-21	2,450	4.7
Logan River	1a-22	100	7.6
Lewiston-Trenton	1a-25	875	3.0
North Cache	1a-26	1,680	3.3
Blacksmith Fork	1a-27	40	4.3
Little Bear	1a-28	546	4.5
Total - Sub-Basin	II	7,491	4.3
Idaho		1,800	
Caribou		130	4.8
Franklin		1,670	4.7
Utah		5,690	
Cache		5,690	4.1

LAKES AND RESERVOIRS

SUMMARY - WEIGHTED ESTHETIC RATINGS (Cont'd)

Watershed-County-State	No.	Surface Acres	Weighted Esthetic Quality Rating
Bear Lake	III		
South Bear Lake	1a1-1	34,400	8.5
Fish Haven-St. Charles	1a1-2	35,850	8.8
Liberty-Bloomington	1a1-3	1,500	4.8
Montpelier	1a-10	100	5.6
Bennington	1a-11	140	3.5
Georgetown	1a-12	160	3.5
Nounan-8 Mile Creek	1a-13	860	3.5
Soda Springs	1a-14	1,130	5.8
Total - Sub-Basin	III	74,140	8.4
Idaho			
Bear Lake		73,010	8.5
Caribou		1,130	5.8
Central Bear	IV		
Fossil Butte	1a-4W	52	4.8
Thomas Fork	1a-5W	17	7.0
Smith Fork	1a-7	384	5.2
Woodhollow	1a-8	63	4.5
Sheep--Pegram Creek	1a-9	500	2.7
Total - Sub-Basin	IV	1,016	4.9
Wyoming			
Lincoln		453	5.2
Utah			
Rich		63	4.5
Idaho			
Bear Lake		500	2.7

LAKES AND RESERVOIRS

SUMMARY - WEIGHTED ESTHETIC RATINGS (Cont'd)

Watershed-County-State	No.	Surface Acres	Weighted Esthetic Quality Rating
Upper Bear	V		
Yellow-Coyote	1a-1	108	4.3
Upper Bear	1a-2	657	7.3
Evanston	1a-3	1,336	3.9
Saleratus	1a-4u	488	4.0
Woodruff Creek	1a-5u	98	4.8
Big Creek-Otter Creek	1a-6	30	4.8
Total - Sub-Basin	V	2,717	4.8
Utah		1,313	5.9
Rich		656	4.2
Summit		657	7.5
Wyoming		1,404	3.9
Uinta		1,404	3.9

Streams

The summary sheets shown in the Streams section set forth the miles of free-flowing and modified-flow streams in each county and state and the composite weighted esthetic quality for each area. They are further summed to sub-basins.

Although stream density was not used as a criterion in developing esthetic quality for the watersheds and counties, it could be regarded as one aspect of the over-all esthetics of a watershed or county. An array of the five greatest watershed densities generally supports this assertion, with one exception. This exception in in the Five Mile watershed, la-19. The high density ratio of this particular watershed is primarily the result of the small land area of this unit.

Listed below are the five watersheds showing the greatest densities;

Watershed		Esthetic Rate	Miles of	Miles Per 1,000 Acres
Name	No.	Free Flow	Stream	Density
Five Mile	la-19	6.3	8.6	1.32
Nounan-Eight Mile	la-13	7.4	90.1	1.00
Montpelier	la-10	8.0	49.9	.96
Thomas Fork	la-5w	7.0	180.5	.93
Smith Fork	la-7	7.0	204.0	.82

INVENTORY AND QUALITY RATING

STREAMS

Since most of the Basin's streams originate in the high mountain watersheds, the pattern of streams was observed in two categories. These are: (1) Canyon reaches, and (2) Valley reaches. These reaches generally exhibit marked differences in amount and character of streamflow, vegetative and physiographic settings and, to a lesser extent, in water clarity and channel conditions.

Although water clarity, flow characteristics, channel conditions and stream conformation are factors restrictively inherent to the stream itself, the inclusion of the physiographic and vegetative settings add depth to the evaluation.

The following systems of ratings were designed to describe and quantitatively express the contribution of stream characteristics to the overall environment of each watershed or other unit of evaluation.

Channel Condition

Class	Rating
Good	10
Fair	7
Poor	3

Stream Conformation

Pattern	Rating
Straight	3
Sinuous	6
Meandering	8
Braided	10

Flow Characteristic

Placid to slow	2
Riffles-rapids	5
Riffles-pools	8
Rapids-falls-pools	10

Vegetative Setting

Type	Rating
Conifer-Aspen	9
Mixed	10
Mtn. Brush-Pinyon	7
Mixed	8
Alpine Meadow	5
Mixed	7
Lowland Meadow	4
Meadow-Crop	6
Sage-Grass	3

This category is descriptive of the vegetation back from the stream and does not include the riparian vegetation which in most cases is a mixture of willow, rose, alder and cottonwood or Box Elder.

Clarity

Class	Rating
Clear	10
Opaque	7
Turbid	4
Muddy	2

Physiographic Setting

Dominant Land Forms	Rating
Narrow Canyon-Ledges-Cliffs	10
Open Canyon-Scattered Outcrops	8
Open Canyon-Rounded forms	6
Rolling-Hilly-Open	4
Flat to Rounded	2

Table 3. STREAMS

SUMMARY - ESTHETIC QUALITY RATINGS

Watershed Name	No.	Free Flow Miles	Free Flow Quality Rating	Modified Flow Miles	Modified Flow Quality Rating	Total Stream Miles	Density Miles Per 100 Acres
Bear River-Malad I							
Little Malad	1a-23	24.0	4.9	35.9	4.0	59.9	.28
Deep Creek	1a-24	10.5	6.9	27.8	4.8	38.3	.35
Ply.-Portage	1a-29			16.2	4.0	16.2	.24
Bear River Valley	1a-30	4.2	5.7	114.0	4.4	118.2	.51
Brigham	1a-31	18.1	6.3	79.8	4.7	97.9	.60
Totals-Sub-Basin I		56.8	5.8	273.7	4.5	330.5	.39
Idaho		34.5	5.5	63.7	4.4	98.2	.31
Oneida		34.5	5.5	63.7	4.4	98.2	.31
Utah		22.3	6.2	210.0	4.5	232.3	.44
Box Elder		22.3	6.2	210.0	4.5	232.3	.44
Cache Valley II							
Cottonwood Creek	1a-15	18.4	6.7	39.0	4.2	57.4	.45
Grace-Thatcher	1a-16	6.8	6.6	39.9	5.1	46.7	.49
Guis River	1a-17	34.1	7.5	66.5	4.8	100.6	.59
Battle-Deep Creek	1a-18	28.5	5.9	31.3	5.1	59.8	.43
Five Mile	1a-19	3.8	6.3	4.8	4.2	8.6	1.32
Weston Creek	1a-20	1.0	7.3	2.2	5.4	23.2	.35
Clarkston	1a-21	14.6	4.4	14.7	4.2	29.3	.61
Logan River	1a-22	36.9	8.8			36.9	.27
Lewiston-Trenton	1a-25			29.0	4.4	29.0	.58
North Cache	1a-26	18.6	8.5	28.1	5.2	46.7	.38
Blacksmith Fork	1a-27	14.8	8.0	31.1	6.6	45.9	.21
Little Bear	1a-28	28.0	7.2	30.9	5.4	58.9	.28
Total-Sub-Basin II		205.5	7.3	337.5	5.0	543.0	.41
Idaho		98.6		203.7		302.3	.48
Caribou		25.2	6.7	78.9	4.6	104.1	.83
Franklin		70.4	7.4	124.8	4.7	195.2	.46
Bannock		3.0	5.9			3.0	.05
Utah		107.1	7.5	133.8	3.2	240.9	.32
Cache		107.1	7.5	133.8	3.2	240.9	.32

STREAMS (Cont'd)

SUMMARY - ESTHETIC QUALITY RATINGS

Watershed Name	No.	Free Flow Miles	Free Flow Quality Rating	Modified Flow Miles	Modified Flow Quality Rating	Total Stream Miles	Density Miles Per 1000 Acres
Bear Lake III							
South Bear Lake	1a1-1	18.9	6.1	15.3	6.0	34.2	.19
Fish Haven-St. Charles	1a1-2	19.5	7.1	3.8	6.5	23.3	.20
Liberty-Bloomington	1a1-3	42.8	7.4	53.6	5.1	96.4	.57
Montpelier Creek	1a-10	22.0	8.0	27.9	5.5	49.9	.96
Bennington	1a-11	1.2	7.0	9.8	4.3	11.0	.39
Georgetown	1a-12	12.9	8.0	6.3	4.9	19.2	.62
Nounan-Eight Creek	1a-13	30.5	7.4	59.6	4.9	90.1	1.00
Soda Springs	1a-14	7.5	7.9	53.6	5.1	61.1	.58
Total-Sub-Basin III		155.3	7.4	229.9	5.1	385.2	.50
Utah							
Rich		18.9	6.1	15.3	6.0	34.2	.20
Idaho		136.4	6.7	214.6	4.9	351.0	.58
Caribou		7.5	7.9	53.5	5.1	61.0	.59
Bear Lake		128.9	6.6	161.1	4.8	290.0	.58
Central Bear IV							
Fossil Butte	1a-4W	18.9	7.8	68.4	4.7	87.3	.44
Thomas Fork	1a-5W	141.7	7.0	38.8	6.0	180.5	.93
Smith Fork	1a-7	137.8	7.0	66.2	3.0	204.0	.82
Wood Hollow	1a-8	37.7	5.4	38.7	3.7	76.4	.68
Sheep-Program	1a-9	7.6	6.7	42.5	4.6	50.1	.48
Total-Sub-Basin IV		343.7	6.9	254.6	4.0	598.3	.73
Wyoming		331.2	7.2	189.6	4.6	520.8	.87
Lincoln		331.2	7.2	189.6	4.6	520.8	.87
Idaho		11.0	6.8	61.3	3.8	72.3	.42
Bear Lake		11.0	6.8	61.3	3.8	72.3	.42
Utah		1.5	5.4	3.7	3.0	5.2	.10
Rich		1.5	5.4	3.7	3.0	5.2	.10

STREAMS (Cont'd)

SUMMARY - ESTHETIC QUALITY RATINGS

Watershed Name	No.	Free Flow Miles	Free Flow Quality Rating	Modified Flow Miles	Modified Flow Quality Rating	Total Stream Miles	Density Miles Per 1000 Acres
Upper Bear V							
Yellow-Coyote	1a-1	47.7	7.9	22.6	6.9	70.3	.55
Upper Bear	1a-2	82.9	8.9	36.1	6.9	119.0	.70
Evanston	1a-3	32.0	6.9	104.6	5.5	136.6	.58
Saleratus	1a-4u	9.8	6.7	20.3	5.0	30.1	.13
Woodruff Creek	1a-5u	34.2	7.2	14.4	5.8	48.6	.54
Big Creek-Otter	1a-6	33.2	5.0	89.2	4.0	122.4	.75
Total-Sub-Basin V		239.8	7.6	287.2	5.3	527.0	.51
Wyoming		32.0	6.9	104.6	5.5	136.6	.38
Uinta		32.0	6.9	104.6	5.5	136.6	.45
Utah		207.8	7.6	182.6	5.2	390.4	.59
Rich		116.9	6.9	146.5	4.8	263.4	.56
Summit		90.9	8.8	36.1	6.9	127.0	.68

SCENIC AREAS

QUALITY RATING- CONCEPTS AND PROCEEDURES

Some areas of land or water in the Basin possess outstanding characteristics of physiography, vegetation or water. These characteristics, in combination with each other or with the mosaic of cultivated fields and rural development make up scenes of great beauty.

The basic criteria for the initial identification of scenic areas was; (1) Areas in watersheds encompassing lands of substantial acreage in the + 40% slope classes, and (2) the presence of a body of water of substantial size with esthetically pleasing characteristics.

Specifically, the distribution of slope groups in each watershed were examined and the criterion established that a contiguous acreage in the watershed be made up of slope in excess of 40 %. Of this acreage of steep lands at least 25 % must have slopes of 75 % or more. Application of these criteria isolated areas of land in 8 watersheds which had mountainous areas generally acknowledged as possessing qualities of a scenic character. The water area of Bear Lake lying in watersheds lal-1 and lal-2 were declared scenic because of the obvious esthetics of the lake.

All the scenic areas were given an initial basic quality rating of 8. This rating was modified by application of the vegetative rating system used throughout the esthetic rating system. Thus, differences in the final rating are due to the vegetative types present and their proportions.

The vegetative classes utilized and their quality values were as follows;

	Vegetative Type			
	Conifer	Aspen	Mountain Brush	Alpine
Quality Values	1.0	.9	.7	.5

The percentage of the acres in each type was applied to their respective values and the total of the weights multiplied by the base value of 8 for a final rating.

SCENIC AREAS

Table 4. ESTHETIC QUALITY RATING

SUMMARY

Name	Watershed Location	Sub-Basin	States	Counties	Acres	Quality Rating
Upper Bear	1a - 2	V	Utah	Summit	53,500	8.3
Smith Fork	1a - 7	IV	Wyoming	Lincoln	67,850	6.7
Bear Lake - South	1a1 - 1	III	Utah	Rich	45,900	8.6
Fish Haven - St. Charles	1a1 - 2	III	Idaho	Bear Lake	47,400	8.7
Georgetown Creek	1a - 12	III	Idaho	Bear Lake	12,025	7.1
Logan River	1a - 22	II	Utah	Cache	44,400	8.9
			Idaho	Franklin	18,200	8.9
North Cache	1a - 26	II	Utah	Cache	52,300	6.8
Blacksmith Fork	1a - 27	II	Utah	Cache	72,700	7.2
Little Bear	1a - 28	II	Utah	Cache	53,800	6.6
Brigham	1a - 31	I	Utah	Box Elder	41,700	5.8

Summary	(Acres)
Wyoming	67,850
Idaho	77,625
Utah	364,300
Total	509,775

OTHER WATERSHED AREAS

QUALITY RATING CONCEPTS AND PROCEDURES

This section includes the balance of lands not identified and rated as scenic areas.

This rating process was carried out in two steps. Initially, lands were segregated by slope groups and topographic diversity rating developed for each watershed. The physiographic and dissection criteria were not applied. In the second step, an array of vegetative type and land use values, with acreages converted to proportions were used to develop a rating modifier. This modifier was applied to the basic topographic rating for a final esthetic quality rating.

The worksheet on the following page illustrates the stepwise procedure and the values assigned to the vegetative cover and land use modifier classes.

ESTHETIC INVENTORY and RATING

Other Watershed Lands

	Unit	SLOPE GROUPS % 0-10	10-20	20-40		(40-75)	(75
TOPOGRAPHY	Class	1	2	3		(4)	(5)
Watershed area	Acres						
	%						
Non-scenic area distribution	%						
Diversity	Points						
Total							
and;							
				Rating			
VEGETATION AND LAND USE PATTERNS		Acres	%	Value	Weight		
Conifers				1.0			
Aspen				0.9			
Mountain Brush				0.8			
Juniper				0.7			
Alpine Meadow				0.6			
Irrigated Land				0.5			
Urban-Residential				0.4			
Sage-Grass				0.3			
Dryland				0.2			
Urban-Industrial				0.1			
Lowland Meadow				0.1			
Barren				0.0			
Total							
And ____ x _____ =							
Weighted Watershed Value			Acres	%	Rate	Weight	

Table 5

ESTHETIC QUALITY RATING

OTHER WATERSHED LANDS

County - State	Sub-Basin I Acres	Sub-Basin I Quality Rating	Sub-Basin II Acres	Sub-Basin II Quality Rating	Sub-Basin III Acres	Sub-Basin III Quality Rating	Sub-Basin IV Acres	Sub-Basin IV Quality Rating	Sub-Basin V Acres	Sub-Basin V Quality Rating	Total Acres	Total Quality Rating
Bannock	800	3.2	62,400	2.8							63,200	2.9
Bear Lake					437,600*	2.9	171,200	2.6			608,800	2.7
Caribou			125,600	2.6	102,700	1.7					228,300	2.2
Franklin	500		407,800*	3.2							408,300	3.2
Oneida	314,200	2.7	18,600	2.3							332,800	2.6
Power	5,800	2.5									5,800	2.5
Idaho	321,300		614,400*		540,300*		171,200				1,647,200	
Box Elder	492,700*	1.1									492,700	1.1
Cache			528,800*	2.8							528,800	2.8
Rich					123,800*	2.8	51,100	1.0	469,100	3.1	644,000	2.4
Summit									134,100*	6.8	134,100	6.8
Utah	492,700*		528,800*		123,800*		51,500		603,200		1,799,600	
Lincoln							529,200*	3.2	66,300	1.6	595,500	2.9
Uinta									301,000	1.6	301,000	1.6
Wyoming							529,200		367,300		896,500	
Basin	814,000		1,143,200		664,100		751,500		970,400		4,343,300	

*Net of scenic area acreage.

Human Interest

There are a number of diverse cultural and natural features in existance throughout the Bear River Basin which command varying degrees of public attention and interest because of their historical, educational, scientific, cultural, or archeological significance.

In the initial development of study procedures for this assessment, it was envisioned that natural or cultural features could be classified and ranked in respect to levels of value placed on them by the public. However, the diverse nature of the items falling in this category precludes the development of a rating system which would consistently reflect relative human interest values.

Some items listed have been described and quality rated in other categories within the context of criteria for that category. The quality rating describing the esthetics of lakes is an example of this and such ratings, in a sense, are partial measurements of human interest, insofar as esthetics induce interest. At some of the lakes, however, the extent of use or other evidences of value indicate a degree of human interest not fully expressed by the esthetic rating. Therefore, to fully express and inventory those features of the environment not classified or rated in other categories and to fully reflect the full degree of interest in those rated in other categories, the following lists are developed.

Objects, Points, or Areas - Focus of Human Interest

Item	Nature of Interest	Location	
		Watershed	Other Specific
Biota			
Bear River Bird Ref.	Educ. - Scientific	1a - 9	Mouth of Bear River
Salt Creek Refuge	" "	1a - 30	Vic. of Little Mtn.
Hardware Ranch	" - Game Mgt.	1a - 27	Sec. 14, T 10N, R 3E
Jardine Juniper	" - Scientific	1a - 22	Sec. 6, T 12N, R 3E
Limber Pine	" "	1a1 - 1	Sec. 34, T 14N, R 4E
Bloomington - Big Spruce	Educational	1a1 - 2	Sec. 28, T 14S, R 42E
Swan Lake Marsh	Bird Habitat	1a - 18	
Bear Lake National Wildlife Refuge	Educ. - Management	1a1 - 2	
Historic			
Hampton Ford Stage Stop	Historic - Natural Feature	1a - 31	Sec. 18, T 12N, R 2W
Calls Fort	Historic	1a - 31	Sec. 15, T 10N, R 2W
Sublette Cutoff	"	1a - 23	Upper Wright Cr.
Old Railroad Grade	"	1a - 30	Corrinne - Promontory
Trapper Rendevous	" (1826)	1a - 28	Vicinity - Hyrum
" "	" (1827)	1a1 - 1	So. of Laketown
Old Ephraims Grave	Historic	1a - 22	Sec. 24, T 12N, R 3E
Estelle Brown Grave	"	1a - 7	1/ (Lander Trail)
Almy Townsite	Historic	1a - 3	Sec. 30, T 16N, R 120W
Old Railroad Grade	"	1a - 3	Chappelle Creek
Charcoal Kilns	"	1a - 3	Sec. 2, T 13N, R 119W
Logging Flumes	"	1a - 2	Mill City Creek
Tie Hack Village	"	1a - 2	Mill City Creek
Myers Ranch	Old Pioneer Ranch	1a - 3	Sec. 12, T 13N, R 120W
Barrel Springs Sta.	Stage Stop-Overland Tr.	1a - 3	Sec. 26, T 14N, R 119W
Bear River Stage Sta.	Historic	1a - 3	Sec. 24, T 14N, R 119W
Shoshone Indian Trail	"	1a-17-1a1-3	Cub River - Bear Lake
Bear River Battleground	"	1a - 18	NW of Preston
Educational			
Tony Grove Field Sta.	Educational	1a - 22	Sec. 12, T 13N, R 3E

1/ Not located to avoid vandalism.

Item	Nature of Interest	Location: Watershed	Location: Other Specific
Geologic-Paleontologic			
Logan River Delta	Geol. - Nat. Feature	1a - 26	Mouth - Logan Canyon
Fucoides Quartzite	Paleontologic	1a - 22	Sec. 18, T 12N, R 3E
Fossil Butte	"	1a - 4W	T 22N, R 118W
Mississippian Ledges	Geologic	1a - 22	Lower Logan Canyon
Red Rock Outlet	"	1a - 18	Sec. 29, T 12S, R 38E
Springs			
Thermal			
Little Mountain	Natural Feature	1a - 30	Sec. 18, T 10N, R 3W
Udy	" "	1a - 30	Sec. 1, R 12N, R 3W
Crystal	" "	1a - 31	Sec. 29, T 11N, R 2W
Bear Lake	" "	1a1 - 2	Sec. 13, T 15S, R 44E
Other Springs			
Ricks Spring	Natural Feature	1a - 22	Sec. 26, T 13N, R 3E
Swan Creek Spring	" "	1a1 - 2	Sec. 6, T 14N, R 5E
Soda Springs	" "	1a - 14	Sec. 31, T 8S, R 41E
Paris Canyon Spring	" "	1a1 - 3	Sec. 4, T 14S, R 42E
Lakes			
Bear Lake	Natural Feature-	1a1 - 1	
	Recreation Center	1a1 - 2	
Mountain Lakes			
Bloomington	Alpine Lake	1a1 - 2	Sec. 5, T 15S, R 42E
Worm Lake	Intermediate Lake	1a1 - 2	Sec. 4, T 15S, R 42E
Tony Grove Lake	Alpine - Cirque	1a - 22	Sec. 5, T 13N, R 3E
White Pine Lake	" "	1a - 22	Sec. 30, T 14N, R 3E
Gibson Lake	Alpine	1a - 22	Sec. 14, T 15S, R 41E
Crescent Lake	"	1a - 22	Sec. 8, T 15S, R 5E
Steam Mill Lake	Alpine	1a - 22	Sec. 21, T 15S, R 3E
Huff Lake	Intermediate Lake	1a - 5W	Sec. 22, T 21N, R 119W
Alice Lake	Alpine Lake	1a - 7	Sec. 19, T 28N, R 117W
High Uinta Lakes 1/	Alpine - Cirques	1a - 2	

Item	Nature of Interest	Location: Watershed	Location: Other Specific
Caves and Caverns			
Baker Mine Tunnel	Old Antimony Mine	1a - 31	Sec. 30, T 10N, R 1W
Tony Lake (3)	Speleological-Geol.	1a - 22	West of Tony Lake
Canteen Springs	" "	1a - 22	Sec. 22, T 14N, R 3E
Unknown (No name)	" "	1a - 22	Sec. 10 or 15, T 14N, R
Mt. Magog	" "	1a - 22	Sec. 31, T 14N, R 3E
Blind Hollow Cave	" "	1a - 22	Sec. 21, T 13N, R 3E
Ricks Spring	" "	1a - 22	Sec. 26, T 13N, R 3E
Green Canyon Cave	" (Archeological)	1a - 22	Sec. 17, T 12N, R 2E
Wind Caves	" (Geological)	1a - 22	Sec. 22, T 12N, R 2E
Brachiopod Cave	" "	1a - 22	Sec. 5, T 12N, R 3E
Temple Peak Cave	" "	1a - 22	Sec. 21, T 13N, R 3E
Keyhole Cave	" "	1a - 22	Sec. 33, T 13N, R 3E
Logan Cave	" "	1a - 22	Sec. 5, T 12N, R 3E
Providence Cave	" "	1a - 22	Sec. 11, T 11N, R 2E
Beaver Cave	" "	1a - 22	Sec. 13, T 14N, R 3E
Amazon Mine	Mine Tunnel	1a - 22	Sec. 21, T 12N, R 4E
Minnetonka Cave	Speleological-Geol.	1a1 - 2	Sec. 26, T 15S, R 42E
Paris Canyon Ice Cave	" "	1a1 - 3	Sec. 4, T 14S, R 42E
Penrose Alcoves (2)	" (Archeological)	1a - 30	Sec. 5, T 10N, R 4W
Wild and Primitive			
Mt. Naomi	Wilderness Character	1a-22-1a-26	Mts. Naomi-Gog-Magog
Uinta Primitive	Primitive Area	1a - 2	T 1S, R 10 and 11E
Miscellaneous			
Standing Rock	Landmark-Historic	1a - 20	Sec. 14, T 15S, R 37E
Medicine Butte	" "	1a - 3	Sec. 23 and 24, T 16N,R12
Bear Lake Overlook	Viewpoint	1a1 - 1	Sec. 35, T 14N, R 4E

1/ At least 250 lakes exist ranging in size from,25 to 65 acres in size. They vary in scenic quality, fish habitat, and accessability but most are at off-road sites. As a focus of human interest, they make up part of the scenic complex which attracts packers into the roadless high country of the Upper Bear River.

REGISTER OF HISTORIC STRUCTURES OR SITES

STATE	COUNTY	REGISTER	DESCRIPTION
Utah	Cache	National	Old Main Building, USU
Utah	Cache	National	Lyric Theatre - Logan
Utah	Cache	National	Isaac Pullum Home, Trenton
Utah	Cache	National	Newton Reservoir - 3 miles north of Newton
Utah	Cache	National	Logan Temple
Utah	Cache	National	Logan Tabernacle
Utah	Cache	State	Edgewood Hall - Providence
Utah	Cache	State	The Soren Hanson "Castle" - Hyrum
Utah	Cache	State	Joseph W. Thatcher Home - Logan
Utah	Cache	State	Isaac Pullum Home - Trenton
Utah	Cache	State	Old Main Building - USU - Logan
Utah	Cache	State	Union Pacific Railroad Station - Log
Utah	Cache	State	L.D.S. Logan Temple Barn - Logan
Utah	Cache	State	Scott Home - Logan
Utah	Cache	State	Old Cache County Courthouse - Logan
Utah	Cache	State	Logan Temple - Logan
Utah	Cache	State	A. L. Reid Home (vacant) - Mendon
Utah	Cache	State	Logan Hydro Station - Mouth of Logan Canyon
Utah	Cache	State	Lyric Theatre - Logan
Utah	Cache	State	Wellsville Tabernacle
Utah	Cache	State	The President's House - USU - Logan
Utah	Cache	State	Moses Thather, Jr., Home - Logan
Utah	Cache	State	Zial Riggs Home - Wellsville
Utah	Cache	State	Paradise Tithing Office - Paradise
Utah	Cache	State	David Eccles Home - Logan
Utah	Cache	State	Logan (Cache Stake) Tabernacle - Loga
Utah	Cache	State	St. John's Episcopal Church - Logan
Utah	Cache	State	Cache Junction Depot and Cafe - Cache Junction
Utah	Cache	Century	William S. Litz Home - Lewiston
Utah	Cache	Century	Heber K. Bankhead Home - Wellsville
Utah	Cache	Century	George Washington Baker Home - Mendo
Utah	Cache	Century	Mary Jane Hunter Home - Smithfield
Utah	Cache	Century	Nicholas W. Crookston Home - North L
Utah	Cache	Century	William F. Rigby Home - Newton
Utah	Cache	Century	James Whitney Home - Mendon
Utah	Cache	Century	Theurer House - Wellsville
Utah	Box Elder	National	Corrinne Methodist - Episcopal Church
Utah	Box Elder	National	Hampton's Ford Stage Stop and Barn - Collinston
Utah	Box Elder	National	Box Elder Stake Tabernacle - Brigham City
Utah	Box Elder	National	Willard Historic District - Willard
Utah	Box Elder	State	Brigham City Coop Store - Brigham Ci
Utah	Box Elder	State	The Bank of Corrinne - Corrinne
Utah	Box Elder	State	Lilly White Home and Harper Home - Harper Ward

STATE	COUNTY	REGISTER	DESCRIPTION
Utah	Box Elder	State	Baron Woolen Mills - Brigham City
Utah	Box Elder	State	Baird Home - Willard
Utah	Box Elder	State	Calls Fort - North of Brigham City
Utah	Box Elder	State	Brigham City Co-op Planning Mill
Utah	Box Elder	State	Shadrach Jones Home - Willard
Utah	Box Elder	State	George Mason Home and Barn - Willard
Utah	Box Elder	State	Richard Jenkins Davis Home - Willard
Utah	Box Elder	State	The Omer Call Home - Willard
Utah	Box Elder	State	John Miller Home - Willard
Utah	Box Elder	State	The George Harding Home - Willard
Utah	Box Elder	State	The Charles Harding Home - Willard
Utah	Box Elder	State	George Facer Home - Willard
Utah	Box Elder	State	The Alfred Ward Home - Willard
Utah	Box Elder	State	John L. Edwards Home - Willard
Utah	Box Elder	State	Washaki Indian Farm
Utah	Box Elder	State	Hansen Cooperative Dairy - South East of Hampton's Ferry
Utah	Box Elder	State	Lyman Wells Home - Willard
Utah	Box Elder	State	Beaver Dam Church - Box Elder County
Utah	Box Elder	State	Knudson Home - Brigham City
Utah	Box Elder	State	Harper Home - North of Brigham City
Utah	Box Elder	Century	William L. Watkins Home - Brigham City
Idaho	Bear Lake	National	Bear Lake Stake Tabernacle-Paris
Idaho	Bear Lake	State	Bear Lake County Courthouse
Idaho	Bear Lake	State	Auditorium-Theater-Paris
Idaho	Bear Lake	State	LDS Stake Office-Paris
Idaho	Bear Lake	State	Former LDS Church-Ovid
Idaho	Bear Lake	State	Georgetown School
Idaho	Bear Lake	State	Old Georgetown School
Idaho	Bear Lake	State	Gutzon Borglum birthplace-St.Charles
Idaho	Bear Lake	State	Unidentified House-Fish Haven
Idaho	Bear Lake	State	Peg-Leg Smith Fort-Dingle vicinity
Idaho	Bear Lake	State	Beckworths Battleground- N Bear Lake
Idaho	Bear Lake	National	Macintosh-Driver House,-Montpelier.
Utah	Rich	State	1827 Rendezvous Site - Rich County
Utah	Rich	State	Randolph Tabernacle - Randolph
Utah	Rich	Century	Henry Lee Home - Woodruff

STATE	COUNTY	REGISTER	DESCRIPTION
Idaho	Caribou	State	Alexander-Power Co.Town-1880
Idaho	Caribou	State	Site of old Camp Connor
Idaho	Caribou	State	Caribou County Courthouse
Idaho	Caribou	State	Enders Hotel,-Soda Springs
Idaho	Caribou	State	City Hall and Fire Sattion Soda Spg
Idaho	Caribou	State	Grain Elevators-Soda Springs.
Idaho	Caribou	State	Presbyterian Church-Soda Springs.
Idaho	Caribou	State	Sheep Rock (Soda Point)
Idaho	Caribou	State	Hudspeth Junction- N of Soda Spgs.
Idaho	Caribou	State	Soda Springs (in and around City)
Idaho	Franklin	National	L. H. Hatch House - Franklin
Idaho	Franklin	National	Oneida State Academy - Preston
Idaho	Franklin	National	Bear River Battleground - NW Presto
Idaho	Franklin	National	Weston Canyon Rock Shelter - near Weston
Wyoming	Uinta	National	Piedmont Charcoal Kilns- 14 Mile NE of Hilliard
Wyoming	Uinta	State	Site of Old Beartown- A railroad town on the original railroad route.
Wyoming	Uinta	State	Site of old Almy town,-a coal-mining town predominantly manned by Chinese laborers.

BEAR RIVER BASIN

HUMAN INTEREST

Archeological Resources

Evidences of ancient cultures in the form of pueblos, cliff dwellings, or other hard-rock structures do not exist in the Bear River Basin. At most sites where ancient man's activities are evidenced by the remains of stone weapons, tools and other artifacts, the setting mostly suggests temporary occupancy by hunters and gatherers. Possible exceptions to this are a few caves and rock alcoves which afforded protection from the elements and were occupied for continuous or intermittent periods.

The activities of modern man have essentially destroyed or modified many identified archeological sites. Of the undisturbed sites in Box Elder County, 114 have been the subject of professional investigation.[1/] Hogup Cave in Box Elder County (but not in the Bear River Basin) yielded evidence which dated use back as far as 6400 B.C. Promontory Cave, is located on the east flank of Promontory Mountain near the lakeshore, but outside the designated boundary of the basin. It has been assigned to the Fremont culture, which is a later (younger) period than the Archaic of Hogup Cave.

Most of the archeological remains throughout the basin are of the so-called open-site type. They are mostly concentrated along major stream courses or marshes and were occupied seasonally. However, some of these seasonal sites were more than random and temporary campsites. These showed evidence of "surface" jacal-type structures (post holes and fragments of pole-impressed burned clay). This evidence is not considered conclusive but is possibly indicative of "repeated occupation by small groups."[1/]

The greatest number of identified sites in the Utah Counties of the Bear River Basin are located in Box Elder County. In all counties, they have been more definitely located by watersheds. This is in accordance with

[1/] D. B. Madsen and M. S. Berry (1974)

an agreement with the State Archeologist whereby general location was permissible but such location was not to appear in a report available to the public. The purpose of locating the identified sites by watershed is to alert planners to the existence of these sites and facilitate cooperation with the State Archeologist in the process of planning land and water projects.

The general location of a number of open sites in Caribou and Bear Lake Counties in Idaho is shown on the Archeologic and Historic Roads and Trails Map which supplements this report. Very little archeologic investigation has been carried out at any of these sites and the values they represent are unknown. It is anticipated, however, that detailed surveys and studies will be carried out as a stipulation of any future phosphate leasing on federal land.

There are no known archeologic sites in the Wyoming counties of Lincoln and Uinta.

BEAR RIVER BASIN

Archeological Resources

State	County	Watershed	Description	Individual Sites	Comments
Sub-Basin I					
Idaho	Oneida	1a-23			NA
		1a-24			
Utah	Box Elder	1a-29	None Identified		Survey needed
		1a-30	4 Multiple-Upland	51	Multiple-River based
		1a-31	2 Multiple-Upland	28	Conc. Bear River
		1-9a	Multiple-Lakeshore	25	Closely Grouped
Sub-Basin II					
Idaho	Caribou	1a-15		1	NA
		1a-16		1	NA
	Franklin	1a-17			NA
		1a-18			NA
		1a-19			NA
		1a-20			NA
Utah	Cache	1a-21	Upland	1	
		1a-22	None Identified	-	No excavation
		1a-25	1 upland-5 river based	6	in Cache County.
		1a-26	2 upland-2 river based	4	High potential
		1a-27	None identified	-	for research.
		1a-28	River based	1	
Sub-Basin III					
Idaho	Caribou	1a-11	Upland	1	
		1a-14	Streamsite	6	
		1a-13	Upland	3	
		1a-12	Upland	1	
	Bear Lake	1a1-2	Streamsite-Marsh	2	NA
		1a1-3	Upland	3	NA
		1a-10			NA
		1a-11			NA
		1a-12			NA
		1a-13			NA
Utah	Rich	1a1-1	1 upland-2 lakeside	3	

BEAR RIVER BASIN

Archeological Resources

State	County	Watershed	Description	Individual Sites	Comments
Sub-Basin IV					
Wyoming	Lincoln	1a-4W	Upland	1	NA
		1a-5W			NA
		1a-7			NA
		1a-8	Upland	1	(Actually in Utah)
		1a-9		2	NA
Sub-Basin V					
Utah	Summit	1a-1	None identified	-	
	Rich	1a-4U	Upland	1	
		1a-5U			
		1a-6			
Wyoming	Uinta	1a-2	None identified		NA
		1a-3			NA

BEAR RIVER BASIN

Plants Used by Native Indians and Pioneer Whites for Food and Medicine

Over 1,200 native plants were used by North American Indians when Columbus discovered the Western hemisphere. Indians used over 200 plants in the Bear River Basin and they taught the mountain men and Mormon pioneers which were suitable for food, medicine, beverages, for construction and for many other purposes. Some of them, listed according to uses, are:

A. FOOD PLANTS

1. Seeds from over 60 grasses and sedges were eaten raw, cooked into mush or bread or stored for winter.

2. The chenopods and sagebrushes as well as numerous other seed producing plants yielded a source of food.

3. Pine nuts from several conifers as well as juniper berries and acorns were eaten fresh, cooked or stored for winter food.

4. The nutritious cambium of cottonwood and aspen was peeled and eaten or were dried and put away dried for later use. This food also served as a preventive against scurvy. The bark of these trees also became an emergency winter feed for horses and mules.

5. Wild roots and bulbs:

Sego lily
Camas
Wild onions
Nutgrass and other bulbs from sedges
Queen Anne's Lace
Thistle
Skunk cabbage
Balsamroot
Licorice plant
Cat-tail
Biscuitroot
Arrowgrass

6. Wild Fruits and Berries

Buffaloberry
Chokecherry
Whortleberry
Hawthorn
Serviceberry
Elderberry
Rose Hips
Squawbush
Wild strawberry
Thimbleberry
Raspberry
Current
Gooseberry
Hackberry
Wolfberry
Snowberry

7. Greens:

Young greasewood leaves and seeds
Cat-tail shoots
Dock
First leaves-annual Sunflowers
Shepherds purse
Wild mustards
Wild onion
Spiderwort
Wild buckwheat
Sheep sorrel
Lambsquarter
Amaranth or pigweed
Prairiemallow
Balsamroot

8. Medicinal Plants:
   - Balsam fir tea
   - Wild buckwheat tea from roots
   - Sticky buds of gumweed for tea
   - Meadowrue tea
   - Horsemint tea (from seed heads)
   - Sagebrush tea
   - Wild rose root tea

9. Sore Throat
   - Bladderpod
   - Licorice root
   - Pinon resin
   - Purple loco

10. Blood Coagulent
   - Powdered root of Solomonseal

11. Laxatives and Remedies for Dysentary
   - Sweet anise
   - Dwarf purple aster
   - Wild buckwheat
   - Cinquefoil
   - Chokecherry
   - Oregon grape
   - Povertyweed
   - Black sagebrush
   - Dock
   - Thistle poppy
   - Willow
   - Fringed sagebrush
   - Foxglove

12. Stomach Ailments

Tea from:

Blue flax
Oregon grape
Peppermint
Big sagebrush
Yarrow
Juniper berries
Valerian roots

13. Emetics for poisoning

Tea from ripe seed of bitterbrush
Balsamroot tea
False helebore
Death camas

14. Beverages and Tonics

Sap from big tooth maple and boxelder
Buffaloberry
White sage
Squawbush
Wild rose
Sweet anise

15. Plants for other purposes.

Numerous other plants were used for poultices, wounds, rhuematism, smallpox, sores and boils, toothache, female trouble, birth control, venereal disease, horse medicine, tick control, narcotics and for tanning.

Some of these plants, particularly some wild fruits and berries, are gathered and eaten annually by present day Basin residents.

BIOTA-FAUNA 1/

The journals kept by early fur trappers and explorers in the Bear River Basin provide a glimpse of wildlife conditions which existed in the period preceding settlement. From these records one gains an impression of a region laced with many clear flowing streams containing abundant beaver. The initial wealth of furs was such that fur trappers and traders held their 2nd annual rendezvous in present day Cache Valley Utah in 1826.

Buffalo were common, although Bear River Basin was near the western and southern limits of their historical range. Elk, deer, and Bighorn sheep were numerous in favorable locations and bear were abundant throughout.

Trappers did not utilize native game birds and waterfowl to any extent when big game was readily available, therefore historical notes concerning these groups are sparse. It is certain that Sage grouse and sharptails were plentiful in the plains and valley of the basin, while marshes along Bear Lake and Bear River, particularly on the delta, supported great numbers of waterfowl in season.

Good populations of fish inhabited Bear Lake and Cutthroat trout were found in most of the basin streams. Early Shoshone Indians frequently encamped on the shores of Bear Lake to capture fish during their spawning runs as evidenced by the artifacts.

Habitat changes brought on by settlement reduced native wildlife populations, setting the stage for introductions of exotic species. These introduced species, particularly the sport fishes, support much of the present day fishing and hunting activity in the basin.

1/ Statistical data from Appendix III Basin Fauna

The variety of natural plant communities, interspersion of irrigated cropland, and the highly developed waterfowl marsh complex, combine to produce a great diversity of wildlife in the basin. This renewable resource is an enjoyment to sportsmen and non-consumptive user's of wildlife as well. While hunting and fishing is of paramount importance to basin residents there is an increasing awareness of wildlife in all its forms. This trend is expected to grow.

Sport Fishery Resources

The present sport fishery of the basin is derived largely from non-native species including rainbow, brook, Brown and Mackinaw trout. Introduced warm-water sport fishes include Largemouth Bass, Walleye, Bluegill, Perch, and Channel catfish. Cutthroat trout are present in suitable habitat but the pure native cutthroat strain has disappeared. Mountain whitefish inhabit the larger, cold-water stream segments; Bonneville whitefish, Bear Lake whitefish, and Bonneville cisco are native only to Bear Lake. None of the known fishes in the basin are classified endangered or threatened.

Stream habitat has been greatly altered by man's habitation. Diversions, channelization, pollution, and erosion have depleted and degraded flows particularly in the lower reaches which historically were the most productive. High turbidity of the Bear River is recognized as one of the main limiting factors upon the sport fishery of the main stem.

Streams in the basin supporting a sport fishery are classified according to esthetics, availability, and productivity and given a biological rating. Class I is the highest quality and is often referred

to as "blue ribbon stream". Only 25 miles of Class I out of a total 1,330 miles of classified fishing stream is found within the basin. This reflects the loss of quality in stream habitat over the years. Class II streams total 255 miles and Class III adds 533 miles. These latter streams are the backbone of the stream fishery resources. The remaining stream mileage is Class IV and V which is of minor value.

Lakes and reservoirs are classified as characteristic cold-water, warm-water, or combination fisheries. The basin contains 75,475 surface acres of cold-water fishery with Bear Lake comprising 70,400 acres of the total. Combination waters total 2,382 surface acres which support both trout and warm-water species. Warm water bodies add another 7,492 surface acres. These acreages represent normal operating reservoir levels.

Fishing is popular in the Bear River Basin and is growing at an annual rate of about 3%. During the 1970 fishing season records indicate about 572,000 angler days were enjoyed on basin fishing waters. This breaks down to about 243,000 days of stream fishing and 330,000 on lakes and reservoirs.

Many opportunities are present to improve the sport fishery resources of the basin. Better control of the siltation and sources of pollution, and restoration of minimum flows to dewatered sections, are the most obvious. Provision of public access and maintenance of permanent pools in situations where they are lacking would be advantageous. Bear Lake offers a very great potential.

Terrestrial Wildlife Resources

Basin residents are fortunate in having large acreages of public land where they can pursue free public hunting and enjoy wildlife. Some of this land area is highly developed for wildlife purposes.

Mule, deer, elk, moose, and other big game inhabit suitable range throughout most of the basin. Generally speaking, there is ample summer range for big game populations but winter range is limited. In critical winters which are not uncommon in parts of the Bear River Basin losses of deer and occassionally elk are a serious problem. Depradation also occurs where agricultural development has encroached upon historical big game winter range areas.

Big game hunting is very attractive in the Bear River Basin. About 109,400 man days of big game hunting was recorded for the basin in 1970, with an associated harvest of 27,300 big game animals. Mule deer hunting was the most intensive with about 94,000 hunter days spent to harvest 26,625 deer. Elk attracted about 15,150 days of hunting in 1970 and 640 elk were taken. Moose hunting added 250 hunter days with a harvest of 46 moose. Additional hunting and harvest was provided by bear and cougar.

Upland game hunting receives heavy participation especially in the Utah portion of the basin. Pheasants are by far the most popular game bird and occupy most of the suitable habitat. Native grouse are gaining more attention both from the hunting and management standpoint. Upland game hunting activity during the 1970 season totaled about 200,000 hunter days afield with a bag of approximately 175,000 upland game birds and mammals.

Loss of upland game habitat is increasing. Changes in agricultural practices such as sprinkler irrigation, concrete ditch lining, intensive cropping, spraying and burning, is reducing permanent cover for pheasants and other farm type wildlife. Little new habitat is being created to offset these losses. While the impact of any individual project is not too serious the cumulative effect of many adverse changes over several years takes a serious toll.

Waterfowl hunting, populations, and habitat in the Bear River Basin is equal to anywhere in the United States. Waterfowl breeding and migrating within the basin number in the millions. Bear River National Wildlife Refuge is rated one of the outstanding waterfowl marshes in existence. This vast marsh area is augmented by surrounding State and private marshlands of high quality.

Waterfowl hunting provided about 300,000 man-days afield in 1970 with an associated harvest of about 147,900 ducks and geese. These figures must be qualified when applied to the basin proper since they include four Idaho counties which lie outside the basin. This could reduce the overall total by 10% or more.

One endangered wildlife species is found within the basin proper. This is the American peregrine falcon. It may still breed within the area and is a known migrant. Other indigenous wildlife species which may be placed on the threatened list are the spotted bat, prairie falcon, and possibly the greater sandhill crane.

Hunting and trapping of fur animals and predators is of growing interest. Recent high prices for long-hair furs has stimulated pursuit

of these animals largely ignored over the past several years.

Big game populations are presently supporting near maximum harvest considering winter range carrying capacity. This situation calls for careful management particularly in relation to any large increase of people within the basin or adjacent counties. Non-resident big game hunting has already been curtailed and this shift may continue in order to protect the future welfare of the big game resources.

Efforts must be increased to conserve and upgrade the remaining big game winter range. Development is diminishing upland game bird habitat in parts of the basin and means must be found to reverse this trend. Hunting demands will continue to grow in the basin and quality of hunting will decline unless renewed emphasis is placed upon habitat preservation and enhancement.

BIOTA-FLORA

Ecological Analysis of Native Plant Communities as one Means of Evaluating Program Impacts on the Environment.

The Bear River Basin ecosystem begins in an alpine zone at is source in the high Uintah Mountains in Utah, then winds north into Wyoming, into Idaho and bends south again into Utah where it ends in a salty desert playa at Great Salt Lake.

A large variety of plant matrixes provide the chief embellishment to the landscape, protects the earth from abrasive effects of the elements, and produces the primal link in the universal food chain. Native vegetation zones are extremely important in this basin where the large open and green spaces cover about three-fourths of the land and provide a cleansing area for air pollutants from sources originating beyond the area. Water yield is the basin's most important production, most of which originates in the snow fields of the Alpine zone and in the high Montane forests.

Plant Indicators in Human Service

Plant Communities are the product of the environment and indicators of it. A proper reading of plant indicators provide the ecologist with the clairvoyance to understand the past, present and potential status of the community. With such clues, he can determine whether the vegetation is developing, maturing, or deteriorating. These dependable indicators signify quality.

Plants provide the planner with vital clues for determining land use, and for safe construction, recreation, and microclimatic influence. Some examples of these indicators are:

A. The Alpine plant community survives on sculptured Uintah mountain peaks in an environment above timberline akin to those in arctic latitudes, too cold for trees and farming. The dwarf grasses, forbs and willows indicate a frigid climate with shallow soils of low productivity. The undernourished vegetation produces little during the brief growing season where moisture absorption and translocation are limited in the icy atmosphere. The site has only limited value for wildlife and livestock grazing, compared to other plant communities. But it ranks high in water production where its frozen snow pack is gradually released in spring and summer to feed springs and streams. It is less preferred by most people than Montane forest but ranks higher in preferability than sagebrush-grass.

B. The Montane forest indicates a high precipitation belt and good snow pack for spring and summer water. Greatest timber production originates here. This is one of the choicest recreation areas and aspen ranges are some of the Basin's best for grazing livestock and upland game.

C. Grass-sagebrush plant community demonstrates a wide variety in climate, soil and producing power. Most of it is used for grazing by livestock, deer and antelope. It is the prime habitat for sage grouse, other upland game birds, and rabbits. Dry farming is practiced on arable soils in the 12 to 16 inch rainfall belt. Heavy stands of sagebrush usually indicates degeneration in range condition or quality.

D. Wet meadows indicate a high water table, tall grass and sedges for hay and pasture and a need for drainage should irrigation be practiced. Standing water in marshes make them unsuitable for farming or grazing unless drained, but the abundantly rooted aquatic plants and algae provide a superior habitat for many species of waterfowl.

E. The depauperate halophytes or salt tolerant plants growing sparsely in the salt flats along the Great Salt Lake near the mouth of the Bear River, grow in a chemical desert where heavy salt concentrations in soil inhibit easy absorption and translocation of water needed by the plants for optimum growth. Salt saturated soils preclude growth of farm crops and range forage. The scanty plant growth provides a minimum food source for a few birds and insects.

Ecological Classification of Plant Communities.

Within broad temperature belts, precipitation is the controlling factor of plant environment. Precipitation is largely responsible for the grand divisions of vegetation, namely plant formations composed of forests, grassland, tundra, and desert, listed in order of their descending water requirements. Formations are sub-divided into associations which indicate regional differences in climate. The forest, grassland and tundra are the only formations represented in the Bear River Basin. Each formation is represented by one association, namely: Montane forest, Palouse prairie or bunchgrass, and alpine. These major plant communities also have related seral or developmental units in various stages of origin or maturity due to local differences in soil, slope, exposure, and available moisture.

A. Climax. According to Dr. F. E. Clements, dynamic ecology is concerned first and foremost with causes and in consequence its dominant theme is one of change. In mountains in the Basin, primary succession on bare rock required thousands of years between pioneering crustlike lichens and the climax montane forest or grass-sagebrush savannas in the semi-arid lower valleys. Mountains are worn down by wind and water; ponds and lakes are filled; rivers grow old; and marshes become dry land suitable for grazing and farming. The mature climax occupies rather homogeneous soils in a local climate. It is the highest floral expression of soil and climate. The alpine community, Montane forest, and bunchgrass-sagebrush savanna (small amounts of sage only) are the climaxes of the basin. There are a number of other communities of economic importances that will be discussed as follows.

B. Subclimax. Temporary plant communities which replace the climax following fire, landslides, flooding, lumbering, plowing, or construction disturbances are subclimax. Grasses, small shrubs and aspen in disturbed Montane forests are members of a subclimax plant community.

C. Developmental or seral plant community. Some of the more stable from an economic standpoint are Mountain brush and savannas between Montane forest, and grassland, wet meadows and marshes are others slowly developing toward a climax forest or grassland. Aspen which plays a key role as subclimax to Montane forest in disturbed areas, also is a pioneer migrant out of savanna at the forest edge where it moves into grass-sagebrush ranges. This present migration is obvious and active at present indicating a favorable climate for advance of the forest behind the aspen. The latter advances into new territory from vigorous rootsprouts. When tops are killed, the roots send forth new sprouts and the stand survives. Soil and plant studies indicate that aspen is a climax plant species in some locations of the Bear River Basin.

These several communities are fairly stable and comprise an important source of range forage. Aspen ranks among the best ranges for livestock and big game, particularly sheep and deer. As stands reach maturity, self-pruning leaves an open stand with an undergrowth of numerous nutritious grasses, forbs, and shrubs. Range site and condition classes are developed for all sites producing forage.

D. Disclimaxes. These arise following overgrazing by livestock and native animals, especially big game. Disclimaxes developed following overgrazing by domestic livestock. The sagebrush disclimax is the most obvious one but cheatgrass has become a common companion.

Reports by Army Engineers and Mormon Pioneers provide proof that bunchgrasses dominated the valleys and normal uplands. Several shrubby and herbaceous Artemisias are native to the area and obviously grew in scattered stands among the dominating bunchgrasses. Once heavy grazing by livestock thinned the climax grasses, the aggressive sagebrush increased and gave the dominant aspect to the landscape. This lowered range condition, production and quality. While masquerading as a climax, this genus occupies numerous range sites from the semidesert in Rich County to a high altitude range on West Fork of Bear River. These variations are shown in the range site and condition descriptions.

Evaluating Quality of the Plant Community

A. Sites. Range lands first are classified by sites. A range site is a fairly homogeneous area where local soils and climate produce about the same kind and amount of climax vegetation. One site may produce a significantly greater variety of plants or may be more or less productive than others. Quality of sites for the Bear River Basin is shown in Table V-3c, page 92. They ar listed in order of their inherent yielding power. Aspen and wet meadow sites are superior to others and the Salt Flat has the lowest rating. Climax plants for each are included under descriptions of range sites and condition classes. A climax community is recognized even for seral communities which may eventually change if climatic or geologic modifications create new environments for such areas.

B. Four Condition Classes. Vegetation of each site is graded into four condition classes, excellent, good, fair, and poor. Climax plants make the best use of soil and water under natural conditions, hence are indicators of highest range conditions, reflecting quality, productivity, and stability. Lower quality plants indicate departures from the climax. For example, an excellent range has 76 to 100% climax plants; good ranges have 51 to 75% original plants; fair ranges have 26 to 50% and poor ranges have only 0 to 25% climax plants. (Tame pastures are not graded according to this system). Forage yielding power is lost with each downward grade in range condition. A

poor condition range may be only ¼ or less as good as an excellent range; a fair range is sometimes less than half as good as excellent, and good range may have only 2/3 of its potential climax plants.

Over 75% of the Basin ranges are in fair and poor condition. Only six sites of substantial acreage have plant cover in both good and excellent condition. Timber producing conifer forests were not given range condition class ratings. At current conditions, range production is only about 53.2% of potential in the Basin.

Fortunately, sufficient original plants remain to allow a reversal of the downward trend and return most of the sites to climax condition. Such improvement is contingent upon future prudent use and management during critical plant growing periods. Unfortunately 20% of the ranges are in poor condition and part of this class will require some grass planting and brush control to achieve the degree of improvement required. Upward trend of brush ranges will be extremely slow. With about only 3.5% of ranges in excellent condition, it is a fact that small relicts in this condition are seen throughout, but amount to less than 1%.

C. Plant Response to Grazing. Classifying plants according to decreasers, increasers, and invaders, has provided obvious clues to signs of both range degeneration and regeneration. Decreasers and increasers are both climax plants but as the terms imply, decreasers are the first to disappear under heavy grazing. Increasers at first multiply under heavy grazing and may eventually decrease when grazing stresses continue too long. Bluebunch wheatgrass is an example of a decreaser under cattle grazing, although it may increase under grazing by sheep. Big sagebrush is an increaser on many ranges. While only a few percent was normal for the climax, amounts in excess of this percent should be classed as increaser. Examples of a few native invaders are gumweed, povertyweed, tarweed, rabbitbrush, and annual sunflower. These survived in restricted communities along wild animal trails, anthills, active flood plains, burned areas and wild animal bedding and rutting grounds. Following introduction of domestic animals, range condition declined and these native invaders increased in quantity. Invading plants from foreign sources came with land exploitation by whites. Some of these are the diffusely spread winter-annual cheatgrass, and the poisonous halogeton, from the Mediterranean region. Cheatgrass

has infiltrated large areas of range in poor and fair condition. Halogeton, a more recent introduction, inhabits ranges in poor condition, especially along roads, trails, on bedgrounds and other disburbed areas. Ranges entirely covered with invaders are automatically classed in poor condition where both yield and quality are low. The cool season cheatgrass exceeds most other invaders in value for grazing. It is best during a short time in the spring when the nutritious forage provides calving and lambing pasture. Dried cheatgrass produces fuel with a high flashpoint creating a fire hazard in the summer and fall. A large percent of range fires can be attributed to this grass.

Endangered Plant Species

While some poor condition ranges have lost most of their decreasers, only seven scarce forbs are endangered or extinct according to Dr. Arthur Holmgren, Curator of the Utah State College Herbarium. Despite the deterioration in condition of much of the range land, it is gratifying to find that most still have sufficient climax plants to regenerate them, given considerable time and corrective treatments.

While some poor conditions have lost most of their decreasers, really no species has been completely obliterated from the Basin. The most threatened was Reed canarygrass from wet meadows and shallow marshes. Fortunately, improved grazing practices, in effect for 20 to 30 years, have helped to regenerate this valuable grazing grass. Great Basin wildrye is another important grass that grows on numerous sites, which was greatly reduced by grazing. In recent years it has made considerable comeback.

Two species of rare occurrence in the Basin are pinon pine and Gambel oak. Pinon pine grows a few miles south of the Hardware Ranch on a branch of Blacksmith Fork River and the oak was seen on the head of Little Bear River south and east of Avon. These two are not endangered by any current plans or developments. In any event, Gambel oak grows in abundance to the south along the Wasatch Mountains. Pinon pine is found in large groves in the western Great Basin. While many species have been reduced in abundance by past overgrazing, there has been no disappearance of gene stock of any plant.

Effect of Soil and Slope on Potential Productivity of Different Sites.

Stocking rates indicated in the following tables are for ranges in excellent condition in favorable years. Grazing capacity of lower elevation ranges for unfavorable years may vary two to three hundred percent below that for favorable years. Stocking rates should be kept in harmony with forage production.

A. Fluctuating Influence of Soil Texture. Loamy soils generally are the most productive in a given climatic zone because of greater depth, water holding capacity, maturity and inherent fertility. For example, High Altitude loam in excellent range condition is best with maximum grazing capacity of approximately 1.45 animal unit months per acre. In a similar rainfall zone, the safe stocking rate for a mountain clay site is only 1.09 A.U.M.S. per acre. An upland loam site 30% slope will support 1.04 A.U.M.S. per acre while a mountain clay site with 30% slope will only provide forage for .53 A.U.M.S. per acre.

B. Slope Influence. Slope influence affect range productivity considerably on some sites and less on others, even when soils are similar. A mountain clay site with a 30% slope provides forage for 1.09 A.U.M.S. per acre whereas a mountain clay site with a 30-60% slope would support .93 A.U.M.S. per acre. An upland stony loam site with a 30% slope would require about 15% less range per A.U.M. than an upland stony loam site with a 30 to 60% slope. Slopes over 40% normally require more intense management. Credit should be given some ranchers and public land agencies who already have withdrawn grazing from overly steep ranges where substantial improvements in plant cover has taken place. Many of these steep ranges provide isolated habitats with good feed, cover and shelter for several kinds of useful wildlife. When numbers are controlled through sound harvesting programs, ranges will remain stable and can be used in perpetuity by wildlife if other seasonal needs are satisfied. Machinery used for brush control normally should be limited to slopes under 20% as a precaution against soil erosion. Sagebrush and several other shrubs have been successfully sprayed with chemicals from the air. Research is needed to perfect aerial treatments for juniper control. Large areas of these trees grow on land too steep or rocky to be cleared safely with machinery.

C. Influence of Slope Exposure on Plant Communities. The north and south slope alternations of plant communities present a delightful panorama of contrast and scenic beauty. These marked differences are a reflection of changes in effective soil moisture, the biggest local factor responsible for the kind and amount of vegetation. Exposure profoundly affects the net amount of moisture available for vegetation. West, south, and north winds blow snow into canyons, areas of heaviest snow pack. North slopes receive extra amounts of snow blown in from south and west slopes, and these frozen drifts release their moisture slowly into streamflow during the spring and summer. Long shadows on north slopes are a prime factor in reducing evaporation and transpiration which cause plants to lose most of their water. The slanting indirect sun rays lessens solar radiation which reduces evaporation and transpiration. The reverse is true on the south and west slopes where more intense solar radiation increases evaporation and transpiration. In mountainous terrain, mesic forests occupy north slopes and grass and shrubs grow on the more zeric south and west exposures. These north and south slope alternes also provide contrasting environmental habitats for people and animals. A spectacular example of this is noted on the north and south slopes of leafy Logan Canyon. The broken south slope with its grasses, mountain mahogany, juniper, sagebrush and bitterbrush provide an admirable protected winter range for deer and elk. It is a favorite hunting area in season. The chain of summer homes indicate that people choose the cooler north slope because of its pleasing seasonal environment. Above the homes are myriads of hanging gardens of trees, shrubs, and wild flowers growing upward from shelving limestone ledges.

Plants and Their Role in the Esthetics of the Landscape.

Natural plantscapes are a feature of the environment with aesthetic qualities. They provide different nuances of color and shading from daylight to twilight. Even more elaborate are the chromatic changes in deciduous plants as they green up in the spring, mature in the summer and shed colored leaves in the fall. Greenish-black conifers add another colorful contrast to the associated deciduous plants throughout the year.

Height of vegetation appears to have a major effect on the aesthetic value of plant groups. Aspen and tall conifers have the greatest appeal. Together

they present two distinct shades of greenery. They grow in cool, moist, mountainous areas near water. This is the most favorable habitat for recreationists. The aspen community is also a choice livestock and big game habitat, especially during the summer.

Small trees and tall brush found in the mountain brush and juniper plant group are next as a choice for visitors. Copses of both deciduous and evergreen trees and shrubs provide a relatively cool atmosphere for summer visitors. Streams and springs are usually adequate. Variety of leaf colors, particularly in the fall, bring nature lovers to such areas. This is a favorite big game habitat which also draws many wildlife observers as well as hunters.

Marsh and wet meadows are next in the aesthetic rating. Summer greenery and height of the herbaceous vegetation gives this plant grouping a higher rating than nearby sagebrush-grass. Aquatic wildlife and abundance of domestic grazing animals give such areas additional appeal.

Sagebrush-grass provides its greatest interest to ranchers, hunters and ecologists. Drab sagebrush expanses are monotonous to the average observer, who rushes through such areas in search of trees, mountains, or towns. Small sagebrush-grass areas intermingled with other plant communities, however, provides a pleasant variety to an otherwise dull landscape. Domestic livestock, large and small game help relieve the monotony of large expanses of sagebrush-grass.

Pickleweed and salt flats present small areas near the mouth of the Bear River and on the shores of Great Salt Lake. Scenic value is low and their main worth is to provide a contrast with the plant communities of sagebrush-grass, salt meadows, and marshes, as well as lake water.

In the following tabulations, the distribution of range conditions is summarized by Counties, States, and Sub-basins. The summarization in the two general classes, - Excellent/Good and Fair/Poor was used in allocating range areas in the Open and Green Space category quality rating process.

Table 6 DISTRIBUTION OF RANGE CONDITIONS

COUNTIES AND STATES

1970

	Total	Exc.	Good	Sub Total	Fair	Poor	Sub Total
			(100 Acres)				
Sub-Basin I							
Oneida							
Forest 1/	341		156	156	137	48	185
Non-Forest	987				798	189	987
Total	1,328		156	156	935	237	1,172
Bannock							
Forest							
Non-Forest	8				5	3	8
Total	8				5	3	8
Power							
Forest							
Non-Forest	59					59	59
Total	59					59	59
Franklin							
Forest	3		2	2	1		1
Non-Forest							
Total	3		2	2	1		1
IDAHO							
Forest	344		158	158	138	48	186
Non-Forest	1,054				803	251	1,054
Total	1,398		158	158	941	299	1,240
Box Elder							
Forest	9		3	3	3	3	6
Non-Forest	1,648				1,183	465	1,648
Total	1,657		3	3	1,186	468	1,654
UTAH	1,657		3	3	1,186	468	1,654
SUB-BASIN							
Forest	353		161	161	141	51	192
Non-Forest	2,702				1,986	716	2,702
Total	3,055		161	161	2,127	767	2,894

1/ Forest in this table refers to National Forest lands.

DISTRIBUTION OF RANGE CONDITIONS (Cont'd)

COUNTIES AND STATES

	Total	Exc.	Good	Sub Total	Fair	Poor	Sub Total
			(100 Acres)				
Sub-Basin II							
Bannock							
Forest	13		6	6	5	2	7
Non-Forest	458				367	91	458
Total	471		6	6	372	93	465
Caribou							
Forest	56		26	26	30		30
Non-Forest	657				358	299	657
Total	713		26	26	358	299	687
Franklin							
Forest	491	1	63	64	185	242	427
Non-Forest	1,473		51	51	1,108	314	1,422
Total	1,964	1	114	115	1,293	556	1,849
Oneida							
Forest	65	1	29	30	26	9	35
Non-Forest							
Total	65	1	29	30	26	9	35
IDAHO							
Forest	625	2	124	126	246	253	499
Non-Forest	2,588		51	51	1,833	704	2,537
Total	3,213	2	175	177	2,079	957	3,036
Cache							
Forest	1,445	24	215	239	474	733	1,207
Non-Forest	1,821		25	25	1,596	200	1,796
Total	3,266	24	240	264	2,070	933	3,003
UTAH							
Forest	1,446	24	215	239	474	733	1,207
Non-Forest	1,821		25	25	1,596	200	1,796
Total	3,267	24	240	264	2,070	933	3,003
SUB-BASIN							
Forest	2,071	26	339	365	720	986	1,706
Non-Forest	4,409		76	76	3,429	904	4,333
Total	6,480	26	415	441	4,149	1,890	6,039

DISTRIBUTION OF RANGE CONDITIONS (Cont'd)

COUNTIES AND STATES

	Total	Exc.	Good	Sub Total	Fair	Poor	Sub Total
			(100 Acres)				
Sub-Basin III							
Bear Lake							
Forest	1,235	50	313	363	538	334	872
Non-Forest	1,409				1,143	266	1,409
Total	2,644	50	313	363	1,681	600	2,281
Caribou							
Forest	111	32	37	69	38	4	42
Non-Forest	319				119	200	319
Total	430	32	37	69	157	204	361
IDAHO							
Forest	1,346	82	350	432	576	338	914
Non-Forest	1,728				1,262	466	1,728
Total	3,074	82	350	432	1,838	804	2,642
Rich							
Forest	165		40	40	81	44	125
Non-Forest	947		10	10	769	168	937
Total	1,112		50	50	850	212	1,062
UTAH							
Forest	165		40	40	81	44	125
Non-Forest	947		10	10	769	168	937
Total	1,112		50	50	850	212	1,062
SUB-BASIN							
Forest	1,511	82	390	472	657	382	1,039
Non-Forest	2,675		10	10	2,031	634	2,665
Total	4,186	82	400	482	2,688	1,016	3,704

DISTRIBUTION OF RANGE CONDITIONS (Cont'd)

COUNTIES AND STATES

	Total	Exc.	Good	Sub Total	Fair	Poor	Sub Total
			(100 Acres)				
Sub-Basin IV							
Rich							
Forest							
Non-Forest	476				227	249	476
Total	476				227	249	476
UTAH							
Forest							
Non-Forest	476				227	249	476
Total	476				227	249	476
Bear Lake							
Forest	111	14	64	78	30	3	33
Non-Forest	1.063		149	149	788	126	914
Total	1,174	14	213	227	818	129	947
IDAHO							
Forest	111	14	64	78	30	3	33
Non-Forest	1,063		149	149	788	126	914
Total	1,174	14	213	227	818	129	947
Lincoln							
Forest	541	6	132	138	387	16	403
Non-Forest	4,196	478	2,168	2,646	1,550		1,550
Total	4,737	484	2,300	2,784	1,937	16	1,953
WYOMING							
Forest	541	6	132	138	387	16	403
Non-Forest	4,194	478	2,168	2,644	1,550		1,550
Total	4,735	484	2,300	2,784	1,937	16	1,953
SUB-BASIN							
Forest	652	20	196	216	417	19	436
Non-Forest	5,735	478	2,317	2,795	2,565	375	2,940
Total	6,387	498	2,513	3,011	2,982	394	3,376

DISTRIBUTION OF RANGE CONDITIONS (Cont'd)

COUNTIES AND STATES

	Total	Exc.	Good	Sub Total	Fair	Poor	Sub Total
			(100 Acres)				
Sub-Basin V							
Rich							
Forest	203		10	10	108	85	193
Non-Forest	3,590				2,266	1,324	3,590
Total	3,793		10	10	2,374	1,409	3,783
Summit							
Forest	294	49	131	180	99	15	114
Non-Forest	224	3	14	17	207		207
Total	518	52	145	197	306	15	321
UTAH							
Forest	497	49	141	190	207	100	307
Non-Forest	3,814	3	14	17	2,473	1,324	3,797
Total	4,311	52	155	207	2,680	1,424	4,104
Lincoln							
Forest							
Non-Forest	661	66	331	397	264		264
Total	661	66	331	397	264		264
Uinta							
Forest							
Non-Forest	2,634	255	1,371	1,626	1,008		1,008
Total	2,634	255	1,371	1,626	1,008		1,008
WYOMING							
Forest							
Non-Forest	3,295	321	1,702	2,023	1,272		1,272
SUB-BASIN							
Forest	497	49	141	190	207	100	307
Non-Forest	7,109	324	1,716	2,040	3,745	1,324	5,069
Total	7,606	373	1,857	2,230	3,952	1,424	5,376

Summary

(100 Acres)

Wyoming	8,030	805	4,002	4,807	3,209	16	3,225
Idaho	8,859	98	896	994	5,676	2,189	7,865
Utah	10,823	76	448	524	7,013	3,286	10,299
Basin Total	27,712	979	5,346	6,325	15,898	5,491	21,389

OPEN AND GREEN SPACE

General Description and Function

The use of land and water areas for Open and Green Space usually involves the establishment of physical enclaves within or contiguous to urban areas. Such enclaves are established in response to the inherent needs of the urban population for maintaining or renewing a degree of relationship with nature. These areas include varieties of parks, natural areas along floodways, streams and canals, bicycle and walking paths, nature museums, nature classroom areas, and other natural areas.

Such areas do not entirely fulfill the needs of all individuals. Many do not reach a rapport with nature except in an isolated and untouched natural setting. For others, a drive in the rural countryside is satisfying. In both examples cited, as well as many other instances, the fulfillment of this need has the basic requirement of mobility; - an ability to transport oneself - and one which is deeply entrenched in the life style of Bear River Basin residents.

Even where the pervasive mobility which characterizes our life style affords easy access to mountain and lake, there is a substantial portion of our urban population whose mobility and consequent opportunity for enjoyment of nature is restricted. These are the old and the very young. For them, the creation of natural enclaves near their place of residence meets a real need. Further, it is reasonable to expect that the increase in population anticipated over the next 50 years will intensify pressures of urbanization and an increasing number of individuals in other age groups will benefit from such areas.

We have then a basic human need for communion with nature on a wide variety of levels. Fulfillment of individual needs is reflected by the range of preference for the settings of forest, mountain, lake, and urban green space.

Open and Green Space - The Supply

Urbanization as examplified by sprawling, haphazard growth, downtown decay, rampant crime and urban slums does not exist in the Bear River Basin. To some degree, however, there is rural blight. This is reflected by the presence, in some local areas, of tumbledown farm buildings, discarded farm machinery, junk cars and unpainted farm houses. Many of the small communities, with an economy based principally on agriculture, are showing signs of decay. Most of these are symptoms of the decline in the economies of agriculture, which has been the trend in the past two or three decades. The principal impact on farms and rural communities is on esthetics, but the magnitude of this impact is substantially buffered by the natural beauty and spaceousness of the mountain valley settings in which they are located. The character of spaceousness is ever present in the panorama of green fields, open valleys, tree lined watercourses and towering mountains in every scene. It can be truly said, therefore, that the two major components of open and green space, that is, their "spatial," and "green," qualities are in ample supply. It may also be added that the quality of this supply is generally high and that the general quality level will remain high so long as the mobility of the population can be held at present levels, the rural aspect of the countryside maintained and development carried out in harmony with the natural attributes of the area.

In recognition of the wide ranging use of extensive areas as Open and Green Space, the whole mosaic of land uses, water and vegetation, is considered as collectively making up the Green and Open Space environment of the Basin and is so evaluated.

QUALITY RATING CLASSESS

By; Land Use-Vegetative Type and Condition

Native vegetation is classified by type, by range condition and by use type (commercial forest). A fourth category is vegetation classed as unsuitable for grazing or forest use.

For purposes of evaluation, the total surface area, including native vegetation, as quantified in Table 1 Land - Water - Land Use and Vegetative Type Areas, will be distributed and rated in the following priorities and classes:

1. Wilderness and Scenic Areas.

These are roadless, isolated or steep mountainous areas showing little impact of man's activities. They include a mixture of vegetative types but would be generally dominated by woodlands and noncommercial forests.

Quality rating 10

2. Lands classified as commercial forest and woodland generally fall in the high condition classes and, as such are comparable in quality to rangelands in excellent and good condition.

Quality rating 9

3. Rangelands in Excellent and Good condition. These are interchangeable in quality with Class 2 - Commercial Forest.

Quality rating 9

4. Irrigated Land.

Quality rating 8

5. Native Vegetation in Fair and Poor condition.

Quality rating 7

6. Builtup Areas - High Density.

This class includes the larger, well developed towns with well maintained greenery and landscaping, including spaceous schoolgrounds, church lots, parks and golf courses.

Quality rating 6

7. Builtup Areas - Low Density.

These lands include rural towns with typical deep lots, with junk cars, old farm machinery, barns, corrals and weeds. Sidewalks, parking and park areas are lacking or poorly maintained. Although the "Open Space", component of the category is present, the "Green" is often lacking.

Quality rating 5

8. Water Areas.

This class includes surface area with a wide range of quality. The areas of marsh along the lower Bear fall in the low quality values whereas the clear high lakes and stream surfaces in the upper basin (including Bear Lake) take on the higher values.

Quality rating 4 to 9

9. Dryland Areas.

Quality rating 4

10. Industrial Areas.

These are inclusions within or on the outskirts of cities and towns. They are included in the Builtup area shown in Table 1 and include commercial areas, pure industrial and agricultural such as corrals, milking barns, farmsteads, and feedlots.

Quality rating 2

11. Barren Areas - Open Pits.

Alkali flats, gravel pits, open mining excavations.

Quality Rating 1

Miscellaneous Native Vegetation

These are generally areas of native plants existing as inclusions in cullivated areas as lands unsuitable for grazing.

Quality rating 6

Table 7

OPEN AND GREEN SPACE

LAND USE AND VEGETATIVE SEPARATIONS

	Wild-Scenic 10 1/	Native Vegetation Exc.-Good 9 1/	Irrig. Land 8 1/	Native Vegetation Fair-Poor 7 1/	Built Up High Density 6 1/	Built Up Low Density 5 1/	Water Areas 4-9 1/	Dry Cropland 4 1/	Indust. 2 1/	Woodland Forest 9 1/	Native Vegetation Misc. 6 1/	Barren-Open-Pit Etc. 1 1/	Composite Quality Rating
						100 Acres							
Sub-Basin I	417	161	1,143	2,897	93	49	575	1,379	9	346	731	759	
Oneida		156	257	1,172		37	15	929	1	276	299		6.3
Franklin		2		3									7.8
Bannock				8									7.0
Power				59									7.0
Idaho		158	257	1,243		37	15	929	1	276	299		
Box Elder	417	3	886	1,654	93	12	560	450	8	70	432	759	6.1
Utah	417	3	886	1,654	93	12	560	450	8	70	432	759	
Sub-Basin II	2,414	418	1,806	4,476	78	100	81	1,780	24	2,465	203		
Bannock		6	11	465		2	2	123			15		6.7
Caribou		26	240	687	1	10	3	146	2	42	98		7.2
Franklin		115	515	1,849	2	60	20	792	5	900	2		7.0
Oneida		30		35			1			32	89		7.1
Idaho		177	766	3,036	3	72	26	1,061	7	974	203		
Cache	2,414	241	1,040	1,440	75	28	55	719	17	1,491			
Utah	2,414	241	1,040	1,440	75	28	55	719	17	1,491			
Sub-Basin III	1,053	482	637	1,758	34	45	735	811	27	2,113			
Bear Lake	594	362	414	850	26	41	378	408	7	1,890			8.2
Caribou		69	137	361	3	2	13	375	20	48			6.1
Idaho	594	431	551	1,211	29	43	391	783		1,938			
Rich	459	51	86	547	5	2	344	28		175			8.5
Utah	459	51	86	547	5	2	344	28		175			

	Wild-Scenic 10 1/	Native Vegetation Exc.-Good 9 1/	Irrig. Land 8 1/	Native Vegetation Fair-Poor 7 1/	Built Up High Density 6 1/	Built Up Low Density 5 1/	Water Areas 4-9 1/	Dry Cropland 4 1/	Indust. 2 1/	Wood land Forest 9 1/	Native Vegetation Misc. 6 1/	Barren-Open-Pit Etc. 1 1/	Composite Quality Rating
Sub-Basin IV	679	3,011	505	2,560		32	10	249	9	921	218		
Bear Lake		227	199	947		13	1	168	1	110	46		7.3
Idaho		227	199	947		13	1	168	1	110	46		
Lincoln	679	2,784	274	1,144		13	7	80	7	811	172		8.5
Wyoming	679	2,784	274	1,144		13	7	80	7	811			
Rich			32	469		6	2	1	1				7.6
Utah			32	469		6	2	1	1				
Sub-Basin V	535	2,057	801	4,467	12	22	22	35	8	2,068	215		
Rich		10	488	3,783		8	11	.25	4	234	128		.7.5
Summit	535	197		321		1	5			816			9.3
Utah	535	207	488	4,104		9	16	25	4	1,050	128		
Lincoln		397		266									3.2
Uinta		1,453	313	97	12	13	3	10	4	1,018	87		8.3
Wyoming		1,850	313	363	12	13	3	10	4	1,018	87		
						SUMMARY							
Wyoming	679	4,634	587	1,507	12	26	12	90	11		259		
Idaho	594	993	1,773	6,437	32	165	433	2,941	36		548		
Utah	3,825	502	2,532	8,214	173	57	977	1,223	30		560	759	
Sub-Basin													
I	417	161	1,143	2,897	93	49	575	1,379	9	731	731	759	
II	2,414	418	1,806	4,476	78	100	81	1,780	24	203	203		
III	1,053	482	637	1,758	34	45	735	811	27				
IV	679	3,011	505	2,560		32	10	249	9	218	218		
V	535	2,057	801	4,467	12	22	22	35	8	215	215		
Total	5,098	6,129	4,892	16,158	217	248	1,422	425	77	1,367	1,367	759	

LAND QUALITY

The primary concept applied in developing land quality rating systems for croplands, rangelands, and commercial forest lands is that (1) varying combinations of climate, soils, topography, and exposure create dominant and limiting environmental units which are (2) modified by historic and current management and use by man.

Features of the natural physical complex which limit use are usually discernable, but such limitations are not always given appropriate recognition by man. Thus, a substantial percentage of lands in the major use categories are now, or have been, used in ways or at levels of intensity beyond their capabilities.

This is not to say, however, that use of all lands is being carried on without regard to their treatment and management needs. Great progress has and is being made in the treatment and management of land in each of the categories and there is accelerating action on the part of land users and managers in the application of sophisticated treatment and management techniques.

A key factor in the formulation of a rating system which describes the element of quality imparted by land to the over-all environment is recognition of both the inherent physical land characteristics and the degree by which use and management has or is modifying the inherent characteristics. In recognition of this factor, therefore, it would appear that the current concepts of land use capability, range condition classification and commercial forest classification would offer the best conceptual basis for developing a consistent and comprehensive land quality rating system.

Accordingly, the quality rating system for croplands was structured around the land capability classes for these lands. Range site and range condition classes were the basis for assessing rangeland quality. Lands occupied by commercial forests were assigned a quality classification on the basis of the intensity of treatment needed for full production of wood products.

Primary Use Ratings - Composite Ratings

The summary table following sets forth data by watersheds, counties, and states. They also show acreages for irrigated, drylands , rangelands, and commercial forest lands. In addition to acreage in each use, a quality rating for that use is shown. In the extreme right-hand column, a composite quality watershed rating is shown.

Quality of land is to be measured within the broad use categories of croplands, rangelands, and woodlands. Criteria developed for quality rating in the three broad categories include:

1. Croplands: Varying types and levels of conservation treatment and management are required to satisfy the physical limitations expressed in the land capability classes and subclasses for irrigated and drylands. In general, that aspect of the capability concept is applied which implies that cropping carried on without regard to proper treatment and management progressively degrades land through erosion, or otherwise constrains its potential productive capacity to a sub-optimum level. In respect to quality, "productive capacity" not only describes the capacity of cropland to produce food and fiber but emphasizes its capacity as wildlife habitat, as watershed and as an esthetic component

of the rural scene. The performance of these functions establishes croplands as a dynamic unit of the environment, and one which has practical significance because of the array of management practices and mechanical measures which have been developed to meet the range of physical limitations normal to any agricultural area.

The quality ratings are made relative to the intensity of treatment implicit in the capability classes. Thus, the level of sub-optimal production for untreated croplands in capability classes I and II would be much higher than those falling in the V to VIII class.

Conversely, those lands being cropped in accordance with their capability limitations (adequately treated) would be considered to be in an optimal production status and would carry the highest quality rating.

The basis for assessing the present and projected quality status of these lands would be the 1967 Conservation Needs Inventory and reasoned estimates by local SCS personnel as to the rate at which full treatment requirements have been met in various parts of their administrative areas for the period 1967-1970. The rate of application of major practices as shown in the 99 reports[1/] may be used as guidelines.

The acreage data in each watershed area should be useful in gaining a perspective of land use in the watershed. The rating element for each use will indicate the degree to which inherent physical features of land units and applied treatment and management contribute to environmental quality. In examining the individual use ratings, it should be kept in mind that the numerical values vary between uses. The numerical ranges for categories are:

1/ SCS Annual Report of Conservation Accomplishments on the Land.

Capability Class	Estimated-Projected Treatment Status							
	Fully Treated				Inadequate Treatment			
	Acres	%[1]	Quality Rate	Wt'd Rate	Acres	%[1]	Quality Rate	Wt'd Rate
Irrigated								
I & II		___	10	___		___	8	___
III		___	10	___		___	6	___
IV - VIII		___	10	___		___	4	___
Dryland								
II		___	5	___		___	4	___
III		___	5	___		___	3	___
IV		___	5	___		___	2	___
II - VII		___	5	___		___	1	___
Total Cropland								
Subtotal Weighted Ratings				___				___
Σ Cropland Quality Ratings								

1/ % of acres total cropland.

Cropland			
Irrigated	Dry	Rangeland	Commercial Forest
4-10	1-5	1-8.8	1-10

The variations should be explained. The dryland quality range of 1 to 5 reflects the concept that even with full application of the best practices, unavoidable soil losses and a reduction in capability for watershed protection, wildlife, and recreation constrains quality to a relatively low level. The upper limit of 8.8 for rangelands is the result of grouping a number of high quality sites for purposes of facilitating the rangeland analysis. If detailed site and condition information had been available by watersheds, a quality range of 1-10 would be used. A more detailed perspective of this can be gained by examining the range rating system set forth in subsequent pages.

The effect of using the acreages in the various use categories to develop the composite rating should be noted. In most cases, the range acreage makes up the greater portion of the total of all uses. This causes the range rating to be the principal determinant of the composite rating.

In general, however, the system is sensitive to variations in treatment level or changes in range condition. The existing ratings can be used to identify use categories and areas where treatment is most needed. The system can also be used to measure the environmental impact of specific amounts and kinds of treatment.

Quality Rating

Rangelands

The rating system for the assessment of range quality includes two major components. These are:

1. Range Sites
2. Range Condition

The inherent differences in sites as influenced by the specific factors of climate, exposure, topography and soils are the basis for assigning numerical values to the various sites. These values represent their relative capability to provide food and habitat for wildlife, water yield to the stream system, watershed protection, a broad spectrum of recreation uses and as forage for domestic livestock.

Although forage production is only one dimension of site value, the AUM's of forage produced from each site under the four classes of range condition constitute a means of expressing initial value relationships which can be further developed into quality values. The array of sites, their relative productive capacity in excellent condition and assigned quality values is presented in the following table:

Table V-3a

Comparative Productivity and Quality Ratings of Range Sites in the Bear River Basin

SRG'S	SOILS SLOPE	MAXIMUM AUM PER ACRE EXCELLENT COND.	QUALITY RATING
Wet	Wet Soils	1.93	10
HP	High Alt. Aspen	1.45	10
TCE	Mtn. Clay 0-30%	1.07	9
ULE	Upland Loam 0-30%	1.04	9
TLG	Mtn. Loam 30-60%	1.00	8
TCG	Mtn. Clay 30-60%	.93	8
TK	Mtn. Sandy Loam	.90	8
ULG	Upland Loam 30-60%	.90	8
UK	Upland Stony Loam	.80	7
UX	Upland Shallow Loam	.58	5
TX	Mtn. Shallow Loam 0-30%	.57	5
UCE	Upland Clay	.53	5
ZK	Semi-Desert Stony Loam	.42	3
USE	Upland Sand 0-30%	.41	3
ZLE	Semi-Desert Loam	.35	2.5
ZX	Upland Shallow Loam	.30	2
ZLD	Semi-Desert Loam 30-60%	.30	2
ZLA	Semi-Desert Alkali Flat 0-25%	.30	2
ZCA		.30	2

The range condition component of the system and the estimate of forage production for each condition provides a means of expressing levels of quality for each site and condition. This is accomplished by assigning a value of 1.0 to the AUM level of production in excellent condition and developing ratios to this index value for good, fair and poor ranges in each site. The following table illustrates the ratios developed for sites in the Basin.

Table V-3b

RANGE CONDITION
PRODUCTION RATIOS

SRG Range Symbol	Excellent		Good		Fair		Poor	
	AUM	R	AUM	R	AUM	R	AUM	R
Wet	1.93	1.00	1.64	.85	1.10	.57	.53	.27
H.P.	1.45	1.00	1.01	.70	.73	.50	.46	.32
TCE	1.09	1.00	.70	.64	.52	.48	.29	.27
TCG	.93	1.00	.60	.64	.44	.47	.25	.27
TLG	1.00	1.00	.71	.71	.34	.34	.14	.14
TK	.90	1.00	.75	.83	.54	.60	.22	.24
TX	.57	1.00	.47	.82	.38	.67	.10	.18
UCE	.53	1.00	.34	.64	.16	.30	.05	.09
ULE	1.04	1.00	.82	.79	.40	.38	.19	.18
ULG	.90	1.00	.70	.78	.34	.38	.16	.18
USE	.53	1.00	.34	.64	.16	.30	.05	.09
UK	.80	1.00	.53	.66	.41	.51	.15	.19
UX	.58	1.00	.46	.79	.30	.52	.11	.19
ZCA	.30	1.00	.20	.67	.15	.50	.08	.27
ZLA	.30	1.00	.20	.67	.15	.50	.08	.27
ZLE	.35	1.00	.29	.82	.22	.63	.19	.54
ZLG	.30	1.00	.25	.83	.19	.63	.16	.53
ZK	.42	1.00	.23	.55	.15	.35	.02	.05
ZX	.30	1.00	.18	.60	.09	.30	.03	.10

R = "Production Ratio."

By applying the condition ratios developed in the preceding table to the basic quality values assigned to each range site, a set of site/condition values can be formulated. A site/condition matrix of quality values is displayed in the following table.

Table V-3c

Rangeland Quality Classification

Range Site and Condition--Quality Matrix

SRG Symbol	Site Rating	Name	Condition Class			
			Excellent	Good	Fair	Poor
Wet Soils	10	Wet Soils	10.0	8.5	5.7	2.7
H.P.	10	High Altitude Asp	10.0	7.0	5.0	3.2
TCE	9	Mtn. Clay 0-30%	9.0	5.8	4.2	2.4
ULE	9	Upland Loam 0-30%	9.0	7.1	3.4	1.6
TLG	8	Mtn. Loam 30-60%	8.0	5.7	2.7	1.1
TCG	8	Mtn. Clay 30-60%	8.0	5.1	3.8	1.9
TK	8	Mtn. Sandy Loam	8.0	6.6	4.8	1.9
ULG	8	Upland Loam 30-60%	8.0	6.2	3.0	1.4
UK	7	Upland Stony Loam	7.0	4.6	3.6	1.1
UX	6	Upland Shallow Loam	6.0	4.7	3.1	1.1
TX	6	Mtn. Shallow Loam	6.0	4.9	4.0	1.1
UCE	5	Upland Clay (5-15%)	5.0	3.2	1.5	0.4
ZX	5	Mtn. Shallow Loam	5.0	3.0	1.5	0.5
ZK	3	Semi-Desert Stony Loam	3.0	1.6	1.0	0.1
USE	3	Upland Sand 0-30%	3.0	1.9	0.9	0.3
ZLE	2.5	Semi-Desert Loam	2.5	2.1	1.6	1.3
ZX	2	Upland Shallow Loam	2.0	1.2	0.6	0.2
ZLD	2	Semi-Desert Loam 30-60%	2.0	1.2	0.6	0.2
ZLA	2	S-D Alkali Flat	2.0	1.3	1.0	0.5

About 18% of the total acreage of the range lands classed as suitable in the Basin lie in the National Forests. Range site and condition information for the National Forest area is available but is formulated at a level of detail to satisfy the planning needs of specific National Forest projects and purposes. Because of its detailed nature, it does not fit with the broadly classed and delineated site and condition information derived from the SRG studies. To fully and consistently apply the rating system, therefore, it was necessary to simplify the rating system so that the Forest range sites could be generally identified and rated along with the non-forest range areas. The rating system was accordingly modified to accomplish this purpose. The steps followed were:

1. Forest sites were generally identified as being principally made up of the high mountain sites and, to a lesser degree, of selected upland sites. The quality values of these sites were aggregated and a mean rating was developed for each condition in the group. Criteria for this and the other groupings included climate as reflected by forage production, topography, and elevation.

2. The balance of the sites were distributed through two other general groups. Mean quality values for these groups were developed in a manner similar to the first group.

3. The modified and simplified rating system was, therefore, made up of 3 broad range site groupings. These groups and the conditions values are shown in the following table:

Table V-3d

Mean Quality Rating Values

Group	Range Group Rating	Name	Exc.	Good	Fair	Poor
1	8-10	Upland-High Mtn. ULG, TK, TCG, TLG, ULE, TCE,				
	mean	HP, Wet	8.8	6.5	4.1	2.0
2	5-7	Upland Mtn. UX, TX, UK				
	mean	UCE	5.8	4.1	2.7	0.8
3	2-3	Semi-Desert Upland-Soil ZK, USE, ZLE,				
	mean	ZX, ZLD, ZLA	2.4	1.6	1.0	0.4

Direct evaluations of range quality were made by distribution of non-forest SRG delineations in each condition, by counties, among the three groups described above. The acreages of Forest rangelands, by condition classes, were assigned to the group 1 category, resulting in a complete array and site/condition classification of all rangelands. A composite county quality rating was developed by using the acreage in each group as weights.

Watershed ratings within each County/sub-basin separation were determined by using the distribution of condition classes in each watershed as a relative guideline of quality. Watershed range acreages were used as weights to correlate watershed ratings within the County/Sub-basin composite.

COMMERCIAL FOREST LAND QUALITY

(Portions of Conifer and Aspen Vegetation Type)

Commercial forest lands with the following percent of its area presently needing reforestation, insect and disease control or timber stand improvement:

Table V-5

Class	Percent needing some of above treatments	Rating
1	0 - 1	10
2	2 - 4	8 - 9
3	5 - 10	6 - 7
4	10 - 50	3 - 5
5	50 - 100	1 - 2

For a description of commercial forest tree species and a description of their major uses, see "Native Vegetation of the Bear River," a working paper, prepared as part of the Bear River Basin Cooperative (Type IV) Study.

Table 8

BEAR RIVER BASIN

SUMMARY - LAND QUALITY RATING

RATED LAND COMPONENTS

Sub-Basin-County-State	Irrigated		Dryland		(Suitable) Rangeland[1/]		Commercial Forest		Totals	
	100 Acres	Quality Rating	100 Acres	Quality Rating	100 Acres	Quality Rating	100 Acres	Quality Rating	100 Acres	Composite Quality Rating
Sub-Basin I	1,143		1,379		3,057		90		5,665	
Oneida	257	6.9	929	3.2	1,395	3.1	90	10	2,672	3.8
Idaho	257		450		1,395		90		2,672	
Box Elder	886	8.2	450	4.4	1,657	2.2			2,993	4.1
Utah	886		450		1,657				2,993	
Sub-Basin II	1,806		1,780		6,480		1,950		12,016	
Franklin	515	6.6	792	3.5	1,964	2.5	410	10	3,681	3.1
Oneida					65	2.2			65	2.2
Bannock	11	6.3	123	3.4	471	2.2			605	2.5
Caribou	240	6.3	146	3.4	713	3.3	50	9	1,149	4.4
Idaho	766		1,061		3,213		460		5,500	
Cache	1,040	7.4	719	3.7	3,267	3.1	1,490	10	6,516	5.4
Utah	1,040		719		3,267		1,490		6,516	
Sub-Basin III	637		811		4,186		908		6,542	
Bear Lake	414	5.8	408	3.9	2,644	3.7	830	10	4,296	5.1
Caribou	137	6.3	375	3.2	430	3.0	40	10	982	4.0
Idaho	551		783		3,074		870		5,278	
Rich	86	4.5	28	3.2	1,112	3.0	38	10	1,264	3.3
Utah	86		28		1,112		38			

BEAR RIVER BASIN

SUMMARY - LAND QUALITY RATING (Cont'd)

RATED LAND COMPONENTS

Sub-Basin-County-State	Irrigated		Dryland		(Suitable) Rangeland 1/		Commercial Forest		Totals	
	100 Acres	Quality Rating	100 Acres	Quality Rating	100 Acres	Quality Rating	100 Acres	Quality Rating	100 Acres	Composite Quality Rating
Sub-Basin IV	505		249		6,387		240		7,381	
Bear Lake	199	5.5	168	3.8	1,174	2.9	40	10	1,581	3.5
Idaho	199		168		1,174		40		1,581	
Lincoln	274	6.3	80	3.9	4,737	4.2	200	10	5,291	4.5
Wyoming	274		80		4,737		200			
Rich	32	5.3	1	4.1	476	1.9			509	2.1
Utah	32		1		476				509	
Sub-Basin V	801		35		7,806		1,164		9,806	
Uinta	313	4.5	10	3.3	2,634	5.2	22	10	2,977	5.2
Lincoln					661	2.6			661	2.6
Wyoming	313		10		3,295		22		3,638	
Summit					518	4.9	700	10	1,218	7.8
Rich	488	5.2	25	4.2	3,793	2.3	442	10	4,748	3.3
Utah	488		25		4,311		1,142		5,966	
Basin	4,892		4,254		27,911		3,672		41,410	

1/ Includes national forest and non-forest area.

Uniqueness Category

Extraordinary qualities of beauty, ruggedness, grandeur, immensity or of unusual scientific significance may set an environmental feature apart from others of its kind. Levels of uniqueness of a resource can be evaluated in relation to its frequency of occurrence in the Nation or the region in accordance with the scale set forth below.

In the classes outlined below, the "Bear River Basin" is construed as making up the "planning setting", and the "Region", as including the states of Wyoming, Idaho and Utah.

Uniqueness Class		Numerical Rating
I.	Unique in the planning setting but occurs in abundance in other parts of the region.	1 - 2
II.	Unique in the region but occurs in abundance in other parts of the nation.	2 - 3
III.	Unique in the region but examples occur frequently in other parts of the nation.	3 - 4
IV.	Rare throughout the nation but several examples occur within the region.	5 - 6
V.	~~Very~~ rare throughout the nation and region with one of the few examples occuring in the planning setting.	7 - 8
VI.	The only one of its kind or only population of a species occurring in the nation.	9 - 10

Components of the Bear River Basin environment which exhibit some degree of uniqueness

The criteria adopted for ranking the uniqueness of an environmental entity is restrictive in that the ranking is within the national frame of reference.

Within the context of the criteria set forth on the following page, the following possess some degree of uniqueness:

	Class	Rating
Bear Lake*	VI	9
Fossil Butte	III	4
Soda Springs	III	4
Jardine Juniper	V	7
Swan Creek Spring	II	2
Limber Pine	II	2
Red Rock Outlet	III	4

* On basis of esthetics and Bonneville Cisco.

Water and Air Quality

The existing quality of water and air and the identification of pollution sources and problems are the subject of study by other Work Groups. However, a generalized overview of water and air pollution can be set forth.

Water Quality

Water quality problems reported include:

Idaho.

Turbidity along main stem of Bear River.
Phosphate in local locations - Caribou and Bear Lake Counties.
Sodium salts - Malad River.
Fecal Coliform - Cub River.

Wyoming.

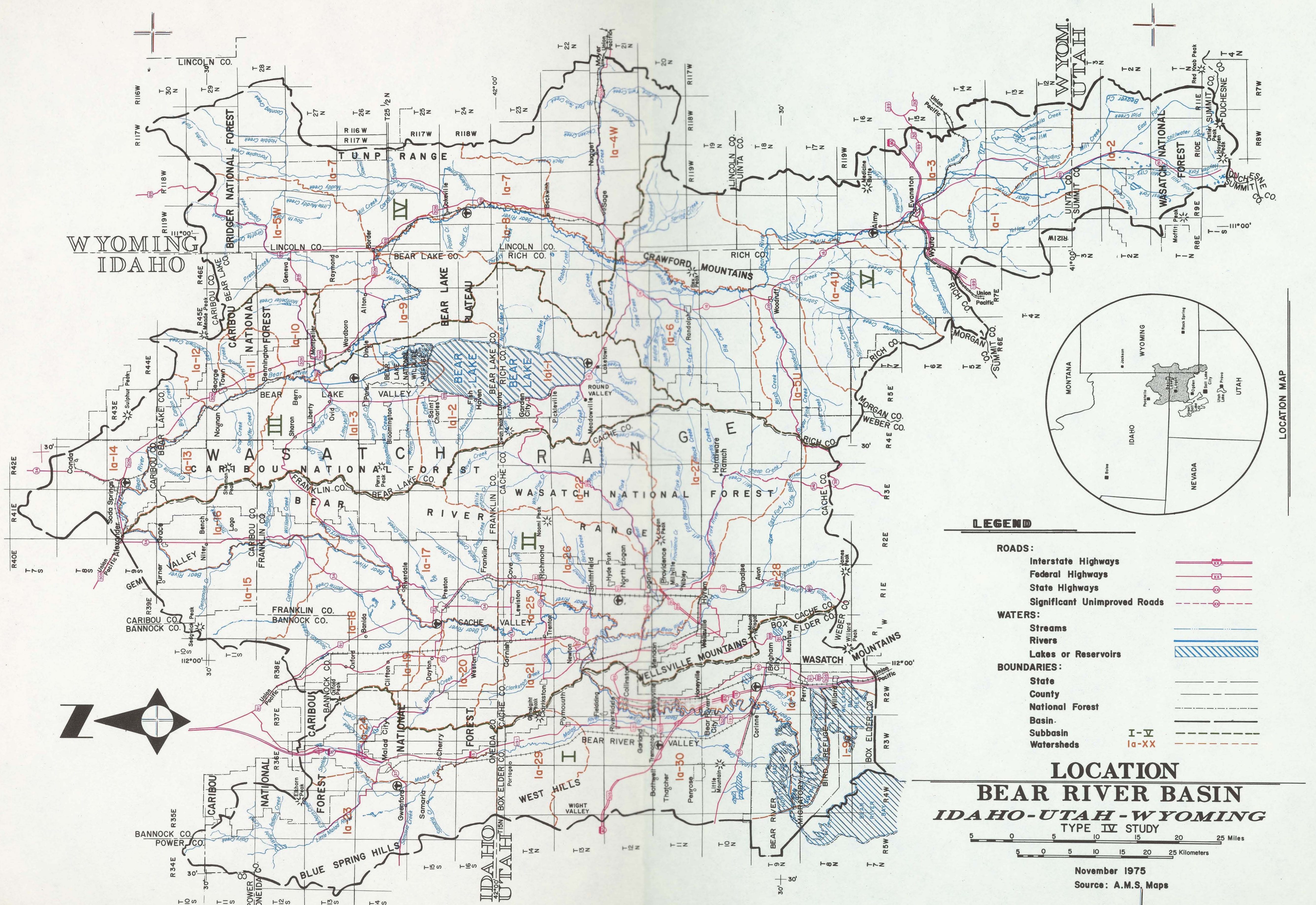
Waters generally within established standards.
Exception: Bear River below Evanston where City's sewage treatment plant is occasionally overloaded.

Utah.

Turbidity along main stem of Bear a general condition. Fecal Caliform above allowable limits in some streams, including Cub River.
Studies under the 208 program are either on-going or scheduled for early initiation in all States.

Air Quality

There is one pollution source in the Soda Springs area - Caribou County. Source is from phosphate processing plants and the principle contaminants are SO_2, fluoride, P_2O_5. It is anticipated that theses sources will come under the schedule of regulation and reduction set forth in the Clean Air Act of 1972.


LOCATION
BEAR RIVER BASIN
IDAHO-UTAH-WYOMING
TYPE IV STUDY
5 0 5 10 15 20 25 Miles
5 0 5 10 15 20 25 Kilometers
November 1975
Source: A.M.S. Maps
LEGEND
ROADS:
Interstate Highways
Federal Highways
State Highways
Significant Unimproved Roads
WATERS:
Streams
Rivers
Lakes or Reservoirs
BOUNDARIES:
State
County
National Forest
Basin
Subbasin I-V
Watersheds Ia-XX
LOCATION MAP
MONTANA
WYOMING
IDAHO
NEVADA
UTAH
Jackson
Rock Spring
Pocatello
Boise
Bear Lake
Logan
Ogden
Salt Lake City
Provo
Utah Lake
Great Salt Lake
WYOMING
IDAHO
WYOM.
UTAH
IDAHO
UTAH
BRIDGER NATIONAL FOREST
CARIBOU NATIONAL FOREST
WASATCH NATIONAL FOREST
TUNP RANGE
BEAR LAKE PLATEAU
WASATCH RANGE
BEAR RIVER RANGE
CRAWFORD MOUNTAINS
WELLSVILLE MOUNTAINS
WASATCH MOUNTAINS
BLUE SPRING HILLS
WEST HILLS
BEAR LAKE
BEAR LAKE VALLEY
CACHE VALLEY
BEAR RIVER VALLEY
GEM VALLEY
ROUND VALLEY
WIGHT VALLEY
BEAR LAKE NATIONAL WILDLIFE REFUGE
BEAR RIVER MIGRATORY BIRD REFUGE
BEAR RIVER BAY
WILLARD BAY RES.
LINCOLN CO.
RICH CO.
BEAR LAKE CO.
CARIBOU CO.
FRANKLIN CO.
BANNOCK CO.
POWER CO.
ONEIDA CO.
CACHE CO.
BOX ELDER CO.
WEBER CO.
MORGAN CO.
SUMMIT CO.
UINTA CO.
DUCHESNE CO.
Evanston
Almy
Wyuta
Woodruff
Randolph
Laketown
Garden City
Montpelier
Paris
Soda Springs
Preston
Logan
Smithfield
Hyrum
Brigham City
Tremonton
Malad City
Cokeville
Union Pacific
I
II
III
IV
V
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE